4K89-12

– Westward Region –

1987-88 GROUNDFISH REPORT

by

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OUTLINE

A. INTRODUCTION

Groundfish are Alaska's fastest growing fishery. Catches by U.S. fishermen have increased dramatically in recent years and now amount to 1 million tons in the Westward Region (Fig. 1). In 1987 groundfish accounted for over 80% of the pounds landed and 29% of the ex-vessel value of all fish and shellfish species harvested in all of Alaska's waters (Figs. 2 and 3).

Due to the Magnuson Fishery Conservation and Management Act, the groundfish fishery is rapidly changing from a foreign to a U.S. enterprise. Foreign harvests have been virtually phased out and joint U.S.-foreign ventures are on the wain (Fig. 4). Almost half of the harvestable portion this vast renewable resource will be caught and processed by U.S. fishermen in 1988. Projections beyond 1988 are speculative, but the trend is clear. Within the next few years, the fishery will complete the transition to U.S. fishermen and many segments of Alaska's economy will benefit greatly.

Although the groundfish fishery is managed mostly by the federal government, the State's interest, like the fishery itself, is evolving. The rapid transition of the fishery to U.S. fishermen is causing major changes in the fishing industry and management agencies. It is essential that the State be an active and informed participant in management decisions affecting this resource.

The scope of this report is to present a summary of the 1987 and 1988 groundfish fisheries in the Westward Region, and to review ADFG's groundfish programs.

Management Unit

Federal groundfish management areas in the Westward Region are defined by the Fishery Management Plans (FMP) developed by the North Pacific Fishery Management Council (NPFMC). FMP's cover the entire Fishery Conservation Zone (FCZ) to 200 miles offshore.

ADF&G submitted a proposal to the Alaska Board of Fisheries to adopt these same management areas for State groundfish regulations (adopted 3/1989) . The Westward Region encompasses the Bering Sea, Aleutian Islands, and central and western portions of the Gulf of Alaska (Fig. 5).

B. FISHERY STATISTICS

Westward Region

Although ADF&G collects and edits groundfish fish tickets (see section D. FISH TICKET PROGRAM), catch statistics are compiled by NMFS and the Pacific Marine Fisheries Commission (PacFIN). For 1988, a species breakdown by FMP area is shown in Table 1; these values include all processor types: domestic shore-based processing, domestic catcher-processors, and joint venture operations.

The Westward Region corresponds to the federal FMP regulatory areas of the Central and Western Gulf, the Bering Sea and Aleutian Islands subareas combined (Fig. 5). These areas account for most of the state-wide harvest of domestic groundfish (Fig. 6).

Domestic groundfish catches in the Westward Region have almost doubled on an annnual basis for the past 10 years, from 1383 tons to almost one million tons in 1988 (Fig. 1, Table 2). Fisheries of particular interest in the Westward Region include Pacific cod, pollock, sablefish, rockfish and flatfish. While cod, pollock and sablefish continue to be mainstay fisheries in the Central Gulf area, the 1988 flatfish catch is already twice the entire 1987 catch of 1,438 tons. Additionally, shore-based Pacific cod longline fisheries are active all seasons (except summer) near Kodiak, Port Bailey, Chignik, Sand Point, Akutan and Dutch Harbor. Some of these fisheries occur inside State waters, but most occur in federal waters.

The ex-vessel value of groundfish in the Westward Region increased from $142 million in 1987 to $226 million in 1988 (Table 3).

Along with increasing catches is the increase in the number of vessels of all gear types fishing for groundfish species (Table 4). Dramatic increases in fleet size are seen in all roundfish, rockfish and flatfish fisheries. For example, the Pacific cod fleet was 10 times greater in 1987 than 1985 in the Central Gulf alone. In the same area, the sablefish fleet expanded from 140 vessels in 1985 to 409 vessels in 1988. The pollock fleet increased eight-fold over the last three years. In both Central Gulf and Bering Sea, the flatfish fleet has increased by over 500% from 1985 to 1987.

Kodiak

1987

At the port of Kodiak, groundfish catches in 1987 ranked first (by landed weight), comprising 55% of all commercial fishery species landed, including shellfish (Fig. 7, Table 5). Groundfish ranked second in ex-vessel value ($ 17.5 million) compared to other harvested species (Fig. 8, Table 5). Within the groundfish group, 98% of the total value in 1987 consisted of Pacific cod, sablefish, and pollock (Fig. 9, Table 6).

Locations where groundfish were caught by bottom trawl in the Kodiak area are shown in Figures 10-13. Trawl catches in the Kodiak area accounted for a large proportion of all groundfish caught in the Central Gulf of Alaska. For the 1987 domestic (DAP) fishery in the Central Gulf, Kodiak trawl catches (58,500 mt) equalled:

96% of the total DAP trawl catch (61,100 mt)
75% of the total DAP catch by all gear types (77,600 mt)
69% of the total DAP, JV and foreign catch, all gear types (84,500 mt)

Trawl catches in the Barnabas area (statistical areas 525702 and 525630) were particularly noteworthy. Catches there (22,600 mt) equalled 37% of the total DAP trawl catch in the Central Gulf.

Most of this harvest occurred during spring and fall months (Fig. 14). In the Kodiak area, trawl catches of pollock and Pacific cod were also greatest in spring and fall, but flatfish catches were more evenly distributed through the year.

Kodiak caught 85% of its pollock on the east side of Kodiak Island and 15% from Shelikof Strait. The latter were caught just prior to spawning in February-April (Fig. 15).

1988

In 1988, Kodiak was second only to Dutch Harbor in groundfish landings in Alaska (Fig. 16). Together these two ports processed over 210,000 metric tons equaling 85% of all groundfish delivered by shore-based vessel to 34 ports around the state. Kodiak, by itself, processed 28% of all statewide landings and 72% of all Gulf of Alaska landings. Both Kodiak's and Dutch Harbor's dominance in this respect is due, in part, to the high-volume pollock fisheries needed to operate the two surimi plants in each of these ports.

Groundfish landings at Kodiak have grown steadily in recent years to almost 190 million pounds (82,000 metric tons) in 1988 (Fig. 17). This far surpasses combined catches of all other fish and shellfish species at Kodiak (Fig. 18). Projections for 1989 show even greater increase in groundfish deliveries compared to the other commercial species harvested at Kodiak (Table 7).

The estimated ex-vessel value of Kodiak's groundfish grew to about $25 million dollars in 1988 (Fig. 19). While this equaled the average annual value of Kodiak's salmon landings in recent years (1980-1987), it was considerably less than the record high value received for salmon in 1988 (Fig. 20). However, the 1988 value of groundfish equaled or exceeded the ex-vessel values for king crab, Tanner crab, Dungeness crab, halibut, herring, and other shellfish landed in Kodiak. When halibut are added to the groundfish category, the total value of groundfish climbs to $47 million dollars in 1988.

The major groundfish species landed at Kodiak in 1988 were pollock (55% of landings by weight), Pacific cod (33%), flatfish species (6%), and sablefish (5%). Catches and values of these species, and halibut, are shown in Figures 21 and 22. Sablefish, pollock, and Pacific cod were of similar ex-vessel value in 1988, each being worth about 8 million dollars.

In terms of tonnage, most deliveries to Kodiak processors were from bottom and midwater trawlers (87%) compared to longliners (12%) and other gear types (1%) (Figure 23).

The number of groundfish vessels that made deliveries to Kodiak in 1988 ranged from 60-180 vessels, depending on the species delivered (Fig. 24). Pacific cod and sablefish were taken by the largest number of vessels partly because these species were caught by both major gear types, longliners and trawlers, in 1988.

In summary, Kodiak has benefited greatly from the "Americanization" of Alaska's groundfish fisheries. Groundfish will continue to exert a substantive and stabilizing influence on Kodiak's economy, not only because rich groundfish resources abound in the Kodiak area, but also because groundfish are a multi-species fishery, consisting of some 20 or more commercial fish species or species groups. The fishery should therefore be sustainable despite inevitable changes in the abundance of individual species.

Dutch Harbor

Groundfish catches at Dutch Harbor in 1987 accounted for 58% by weight and 14% by value of the total fish and shellfish

landings in 1987 (Figs. 25 and 26, Table 8). The catch amounted to 74 million pounds with an ex-vessel value of $ 8.4 million dollars.

C. ON-BOARD OBSERVER PROGRAM

Purpose

The "Americanization" of the groundfish fishery has spurred the State's interest because of the growing importance of this fishery to Alaskan coastal communities. One manifestation of this interest is the on-board domestic observer program. Although ADF&G has had a small-scale observer program for about 10 years, attention has been drawn to this program for two reasons. First, ADF&G's program focuses upon the DAP (Domestic Annual Production) segment of the fishery which has increased dramatically in the past year (Fig. 1). Second, state/federal observer coverage of the DAP is extremely low, so the available data have increased significance.

The primary objective of the observer program is to determine the "bycatch" rate of non-target but otherwise fully utilized species (salmon, crab, halibut, herring) that are caught by various gear types. Because fishermen are not allowed to retain these prohibited species on their boats, the fish are discarded at sea and thus cannot be accounted for when the ship returns to shore. Documentation of bycatch rates is essential to minimize adverse impacts to species already allocated to other Alaskan fisheries.

Budget and Personnel

The 1987 program (FY87 $ 242K) consisted of management staff (Leslie Watson) and a combined total of 35 man-months of observer and technician positions. The observers were stationed at Kodiak (Dave Owen, Tom Dinnocenzo, Kim Phillips, Matt Dick, Jeff Fox) and Dutch Harbor (Kevin Brennan, Bob Wilkey, Tricia Crandall).

In FY88, the budget dropped 10% to 220K, but we also received additional outside funding for the observer program. Both the International Pacific Halibut Commission ($30K grant) and the Alaska Fisheries Development Foundation ($35K grant) contributed to ADF&G's observer program. Staff changes in 1988 included putting Dave Owen in charge of observer deployment, hiring Mike Ward to serve in Dutch Harbor, and several new observers (Leif Brockman, Ed Hajdys, Rick Gottwald, Kim Rudge, Tom Pearson, Jim Brighenti, Ann Wakefield, Meta Parker).

1987 Results

The observers concentrated on the shore-based segment of the DAP rather than the offshore catcher-processor segment. In 1987, 36 observer trips were made, during which 329 tows/sets and 499 pots were examined:

	- 1987 Observer Trips -		
Gear	Kodiak	Dutch H.	Other
Bottom trawl	17	3	1
Midwater trawl	4	4	
Longline	6		
Pot	3		

Note: two trips included 2 gear types

The distribution of observer trips generally reflected the locations and times that the commercial fishery operated. Most shore-based trips occurred on the east side of Kodiak Island (Fig. 27) during fall and spring (Fig. 28).

Year-end summaries of bycatch and species composition are presented for the following fisheries or areas (Tables 9-12):

KODIAK AREA	Table 9.	Bottom trawl
		Bottom trawl, Barnabas area
	Table 10.	Longline, sablefish target
		Longline, Pacific cod target
	Table 11.	Midwater trawl
S. BERING SEA	Table 11.	Midwater trawl
	Table 12.	Bottom trawl

The species composition of the salmon bycatch (n= 250 in combined gear types and areas) was 99% chinook and 1% chum salmon.

1988 Program Design

The observer program was critically reviewed in 1988. This section examines three topics related to the design of the observer program: (1) where are we now, (2) where do we want to be, and (3) what will be done in 1988.

A. Where are we now?

The Americanization of the fishery has been accompanied by a drastic decline in monitoring of the fishery by means of an

observer program. Prior to 1988, NMFS observers monitored about 85% of the foreign and joint venture (JV) segments of the groundfish fishery. In 1988, however, observer coverage has plummeted because only 1-3% of the DAP segment of the fishery is monitored by observers (Figure 29). As the DAP segment of the fishery increases each year, the overall coverage of the fishery by observers decreases. This is particularly apparent in the Gulf of Alaska where observer coverage in 1988 is less than 10% due to the high allocation to DAP. Clearly we need to focus our efforts in 1988 so that our data will be of some use.

B. Where do we want to be ?

It is first necessary to define the purpose of the observer program because that determines the level of observer coverage needed. For the purpose of this report, it is assumed that the overall objective of the program is to (a) provide biological data for management decisions, rather than (b) serve as an enforcement mechanism to insure regulatory compliance. While 100% coverage might be desirable for an enforcement program, a biological program requires substantially less observer coverage of the fleet to produce results that are statistically meaningful for management pruposes.

C. Are existing data statistically adequate?

In a word, no. Bycatch rates are not available for most segments of the domestic groundfish fishery. We therefore have to rely on NMFS estimates derived from JV fisheries which may or may not be representative of bycatch rates for DAP fisheries.

The DAP fishery with the largest "database" is the shore-based bottom trawl fishery at Kodiak Island. In 1987, ADFG gathered bycatch data from 16 vessels in that fishery. Although these results are useful, the 16 individual data points are quite variable as often occurs with small sample sizes.

The results show that the average bycatch rate of halibut, for example, was 40.4 kg/mt:

	------BYCATCH RATE------	
	Observed	Actual
Species	(kg/mt)	(kg/mt)
Halibut	40.4	19-62
Tanner crab	5.3	0-11
Salmon	0.8	0.2-1.4

"Actual" = 95% probability that the population mean lies within this range

Statistical analysis of the sample variability shows that the halibut bycatch rate actually lies somewhere in the range of 40.4 kg/mt plus or minus 54%, which equals 19-62 kg/mt. This degree of imprecision can translate into large changes in the allocation of fish quotas. A halibut bycatch rate based on the available data could be 54% too high (or 54% too low).

D. What degree of statistical precision is needed?

In the above example, the range of halibut bycatch rates could be tightened by increasing the sample size as shown in Figure 30. The shape of this graph shows that we can greatly improve the bycatch estimate by increasing observer coverage of the fleet up to about 20%, but beyond that point we gain relatively little precision for the effort expended. At the 20% level of fleet coverage, the precision of the halibut bycatch estimate would be 40.4 kg/mt plus or minus 15%, which would indicate that the "true" mean lies between 34 and 46 kg/mt. If that range is still unacceptably large, we can increase the sampling effort accordingly, but at greater cost.

As shown in Figure 30, there is considerable statistical precision to be gained by combining state and federal databases because we are currently at the low end of the graph (i.e., very low observer coverage of the fleet). Otherwise, we will end up with two separate and relatively imprecise estimates of bycatch for the same fishery.

A final point. It is important to remember that the above discussion pertains only to one segment of the DAP (the Kodiak shore-based bottom trawl fishery), although this fishery is one of the largest segments of the DAP.

Observer Program Focus in 1988

The first step in organizing our observer efforts in 1988 was to coordinate our program with the federal observer programs being conducted by NMFS, NPFMC and Sea Grant. Over the past several months, we held several meetings on this topic and accomplished the following:

(a) Standardized Methodology. Both state and federal observer programs now use the same methodology and data forms. This will maximize the use of data collected and facilitate the creation of a unified database.

(b) Field Coordination. ADFG will provide a modest level of logistical coordination at its field offices in Kodiak and Dutch Harbor in order to minimize

duplication of observer efforts and present a more coordinated program to industry.

(c) Coordinated Objectives. Rather than having both groups be responsible for covering the entire groundfish fishery, ADFG will focus on the shore-based segment of the fishery while Sea Grant will emphasize the catcher-processor segment of the fishery.

A. Focus #1: Bycatch Priority Issues

Given that our budget will not allow us to provide state-wide observer coverage for all gear types in all areas, we must first get an overview of where most of the fishery occurs and how the fish are caught.

A large portion of the DAP in 1987 consisted of pollock (66%). These fish are generally caught by mid-water trawl, a gear which has a relatively low bycatch of other species (crab, halibut, salmon, herring). Therefore, it makes sense to set pollock and midwater trawl fisheries aside and concentrate on the remaining gear types that may have a bycatch concern.

If we exclude pollock from our consideration, where is the rest of the DAP harvested in Alaska? Figure 31 shows the regional distribution of DAP with and without pollock. Two areas, the Bering Sea and Central Gulf of Alaska, accounted for most of the non-pollock DAP in 1987. Our geographic area of interest is further refined below.

B. Focus #2: Economic Significance to Alaskan Communities.

Because of the direct economic importance that shore-based processing has to Alaska coastal communities, ADFG observers will focus on shore-based processing rather than catcher-processors or mother vessels. (Sea Grant observers, on the other hand, will attempt to monitor catcher-processors.) From this perspective, Figure 32 shows that the Central Gulf of Alaska accounted for the majority of shore-based processing in 1987. Therefore, the Kodiak area will receive most of our observer efforts. Dutch Harbor will be a secondary area of operations.

C. Conclusion: List of Priorities

Given the foregoing considerations, the overall objectives and specific tasks of the ADF&G observer program are outlined below and ranked according to priority. (Not included here are related tasks such as public information requests, permitting, data analysis, reporting, etc.)

PROGRAM OBJECTIVE: Monitor developing domestic fisheries for groundfish, particularly in shore-based fisheries where the bycatch of other important species is a significant concern.

TASK PRIORITY. A breakdown of time devoted to each priority grouping of tasks is: High (75%), Moderate (25%), Low (0%).

HIGH	1.	Shore-based bottom trawl fisheries primarily in the Kodiak area and secondarily in the Dutch Harbor area.
	2.	Test fisheries to examine particular areas or problems.
MODERATE	3.	Spot-check bycatch rates in longline, gillnet and pot fisheries
	4.	Unanticipated requests and problems ("brush fires")
	5.	Dockside sampling
	6.	Shellfish fisheries
LOW	7.	Catcher-processor bycatch issues
	8.	Stock analysis of Shelikof and east Kodiak pollock
	9.	Fisheries with low bycatch (e.g., midwater trawl)
	10.	Logbook programs
	11.	Bycatch survival experiments
	12.	Biological information beyond standard analyses

1988 Results

In 1988, 82 observer trips were made on shore-based vessels (this total includes 8 trips made be NMFS/SeaGrant observers and released to ADF&G through a data sharing arrangement):

	- 1988 Observer Trips -	
Gear	Kodiak	Dutch Harbor
Bottom trawl	44	4
Midwater trawl	22	4
Longline	7	
Pot	1	

Year-end summaries of bycatch and species composition are presented for the following fisheries or areas (Tables 13-17):

KODIAK AREA	Table 13.	Bottom trawl
	Table 14.	Longline, sablefish target
	Table 15.	Midwater trawl
S. BERING SEA	Table 16.	Bottom trawl
	Table 17.	Midwater trawl

Marine Mammal Bycatch

The incidental catch of marine mammals by domestic groundfish vessels has generally been low in recent years (Table 18). Although yearly observer coverage from 1978 to 1988 was limited, the total coverage of domestic bottom trawlers amounted to 108 vessel trips and 1176 trawl hauls. All mortalities (n=3 sea lions) occurred in 1980 when sea lions were frequent visitors to fishing boats. In more recent years, the domestic harvest of groundfish has increased greatly but observed mortalities of marine mammals have been nil.

D. FISH TICKET PROGRAM

Purpose

The purpose of the groundfish fish ticket program is to monitor the domestic groundfish landings in Alaska, thereby providing catch and effort data necessary to monitor in-season harvest quotas by species, gear type, and regulatory area. This program allows the National Marine Fisheries Service (NMFS) to meet its management responsibilities under the Magnuson Fishery Conservation and Management Act and fishery management plans for the U.S. Exclusive Economic Zone. The program also allows ADF&G to meet its groundfish management responsibilities for State waters. In 1987 NMFS awarded funding to ADF&G to collect, edit, and data entry of fish tickets into the groundfish database.

Because ADF&G had ceased collecting groundfish tickets in 1986 and early 1987, it was necessary to expend considerable time in 1987 and 1988 re-establishing contacts with all segments of the domestic groundfish industry, especially catcher-processors (CP) and mothership-processors (MP). Intensive communications with industry (regarding timely submission of accurately completed groundfish tickets directly to ADF&G) has now resulted in greatly improved compliance by all processing sectors.

Current contract requirements necessitate that ADF&G submit fish ticket data on a weekly basis to NMFS in Juneau. Collection, editing and data entry are the major steps necessary before a groundfish ticket is merged into the database. Collection is acheived by processors either mailing or hand-delivering their tickets to ADF&G. Where possible, ADF&G staff in Kodiak, Sand Point and Dutch Harbor have also collected the tickets personally. This process has been streamlined considerably with the exception of certain catcher-processors and motherships that either cannot or will not expedite their tickets.

The most time-consuming element of this program has been editing the ticket prior to computer entry. This involves the biologist tracking down such items as statistical area number and delivery condition code, and the data entry clerk editing ADF&G numbers, permits and processor codes. Entry is generally rapid but can be slowed by system failures (e.g. batch transfers made electronically via modem to NMFS-Juneau). The groundfish database is continually corrected and updated as the year progresses, explaining the fact that current releases of groundfish data are almost always somewhat out-of-date.

Other fish ticket related work included: 1) explanation of the required ticket contents to users, 2) dissemination of ADF&G statistical area charts, 3) coordination with NMFS and FWP enforcement sections to ensure ticket compliance, 4) forwarding halibut, salmon, crab and herring tickets to appropriate entities, and 5) analysis of groundfish data for use by Westward staff (e.g., Kodiak area crab bycatch issues).

Budget and Personnel

Beginning in June, 1987 NMFS awarded a 12-month contract to ADF&G for the collection, editing and entry of groundfish fish tickets. This contract was renewed in 1988 and is intended to be extended for the next 3-5 years. In 1987, the Westward region received 90K (out of the 300K total State-wide contract amount) which covered 19 man-months of personal costs, travel, and contractual items. The Kodiak office also received custodianship of two computers and associated software and communications equipment for data entry (to be returned at contract's end). The 1988 contract was increased slightly (95.6K).

Leslie Watson has been in charge of the fish ticket program, and Marvis Beasley is the data processing clerk.

Results

The Kodiak office continues to play a central role in the groundfish catch monitoring arena, not only for the Westward region but occasionally Statewide. The Kodiak office has entered tickets for the Central region (1987 and 1988) and for Southeastern (1987). In 1987, Westward Region groundfish staff collected, edited and entered 8,617 fish tickets comprised of 19,754 ticket items or approximately 60% of all tickets and items processed Statewide. In 1988, the Westward Region processed 57% of statewide groundfish tickets (Table 19).

In reviewing the 1987-88 fish ticket contract period, several concerns have arisen. First, in light of anticipated increases in the number of groundfish landings, a re-evaluation of our future ability to provide this service at current funding levels may be necessary. Second, the lack of basic catch data analysis and associated reports from NMFS has, until recently, reduced ADF&G's ablity to respond to public requests for data and our own management needs.

E. TEST FISHERY PROGRAM

Purpose

In 1985 the Alaska Board of Fisheries closed many Kodiak waters (0 to 3 miles) to bottom trawling because of concern for the potential bycatch of king crab and other species. In 1987, ADF&G and the Kodiak Groundfish Committee initiated a test fishery program to determine current bycatch rates in these waters. An additional survey occurred in 1988.

The test fishery was conducted in November 1987 in three locations on the west side of Kodiak Island: Spiridon Bay, Viekoda Bay, Kupreanof Strait (Fig. 33). In March 1988, a repeat survey was conducted in Spiridon and Viekoda bays. The principal objective of the surveys was to determine bycatch rates using a commercial bottom trawl commonly used in the Kodiak area to target flatfish and Pacific cod.

Budget and Personnel

For the November 1987 survey, the survey vessel (F/V Hickory Wind), net, and vessel crew were provided gratis by David Harville. Other ADF&G crew were Forest Blau and Kim Phillips.

Direct costs for the March 1988 survey were 3.1K and revenue received for the sale of the fish caught was 2.5K, for a loss of 0.6K. The 1988 survey was conducted by Peter Craig, Dave Owen, Bob Wilkey, and Forrest Blau.

Results

1987

A total of 18 trawls were made using a Bering Sea Combination Net. Largest catches of were made in Spiridon Bay (16,854 kg/hr) consisting mostly of yellowfin sole, starry flounder and flathead sole (Table 20). Lesser catches were taken in Viekoda (6615 kg/hr) and Kupreanof Strait (5805 kg/hr). Bycatch rates of halibut were lowest in Sprirdon Bay (62 kg/hr) compared to the other two areas (139-286 kg/hr)(Table 21). Tanner crab were more evenly distributed in the three study areas (10-39 kg/hr). Few king crab were found and only in Viekoda Bay (3.4 kg/hr).

1988

During March 1988, 32 trawls with an Aleutian Combination net were towed in Viekoda and Spiridon bays. Catch rates from the survey portion of this study were about one half of that from tows simulating commercial operations. Overall catch rates were similar in the two bays (2938-3130 kg/hr)(Table 20). Bycatch rates of Tanner crab were higher in Viekoda, while dungeness were higher in Spiridon (Table 21). Bycatch rates of halibut were similar in the two study areas. No king crab were caught.

November 1987 vs. March 1988

Overall catch rates were 4 to 6 times greater in November than March. Halibut bycatch rates were highest in Viekoda Bay in November. Tanner crab bycatch rates were highest in March, especially in Viekoda Bay. Softshell Tanner crab were more abundant in March (16%) than November (0%). King crab were present in low numbers in November but none were caught in March.

F. LIST OF GROUNDFISH REPORTS

1. Incidental catch of marine mammals and seabirds by domestic groundfish vessels in Alaska. ADF&G Regional Rep. No. 4K88-33.

2. A bottom trawl survey on the west side of Kodiak Island: Viekoda Bay, Spiridon Bay, and Kupreanof Strait (November 1987). ADF&G Regional Rep. No. 28.

3. Distribution maps of groundfish trawl catches in the Kodiak area (January 1987 - March 1988). ADF&G Regional Rep. No. 4K88-22.

4. A bottom trawl survey on the west side of Kodiak Island: Viekoda Bay and Spiridon Bay (March 1988). ADF&G Regional Rep. No. 4K88-29.

5. Distribution maps of trawl bycatch (halibut, crab, salmon) in the Kodiak area, 1978-1987. ADF&G Regional Rep. No. 4K88-30.

6. Value of groundfish to the Port of Kodiak. ADF&G Regional Rep. No. 4K89-2.

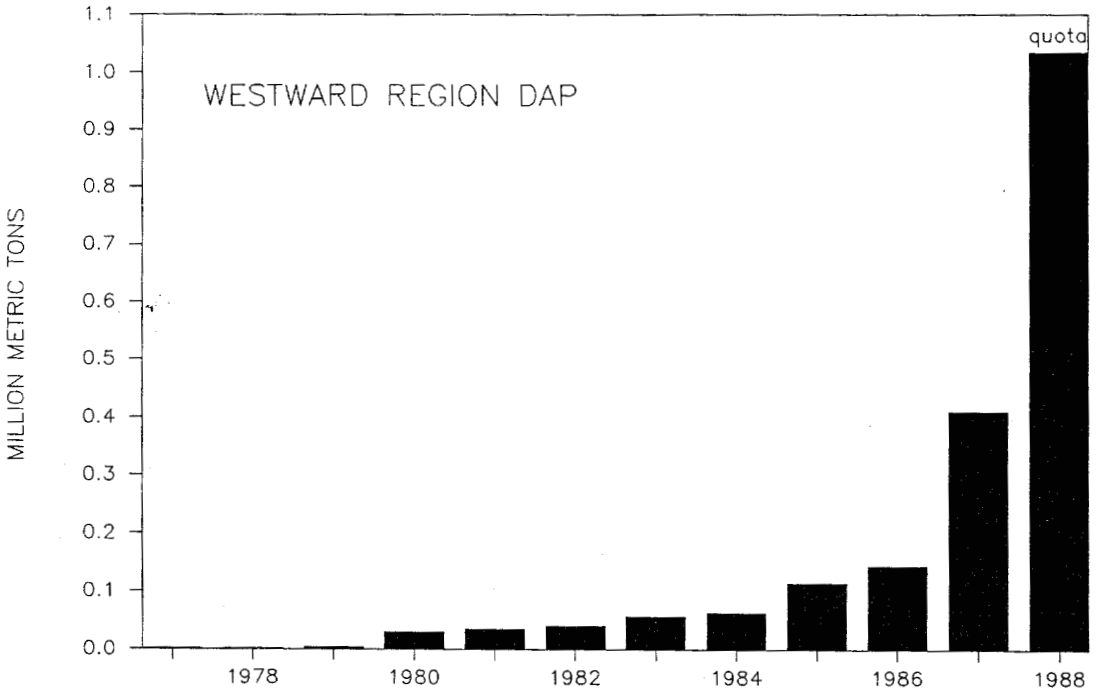

Figure 1. Yearly increases in the domestic harvest of groundfish in Alaska's Westward Region

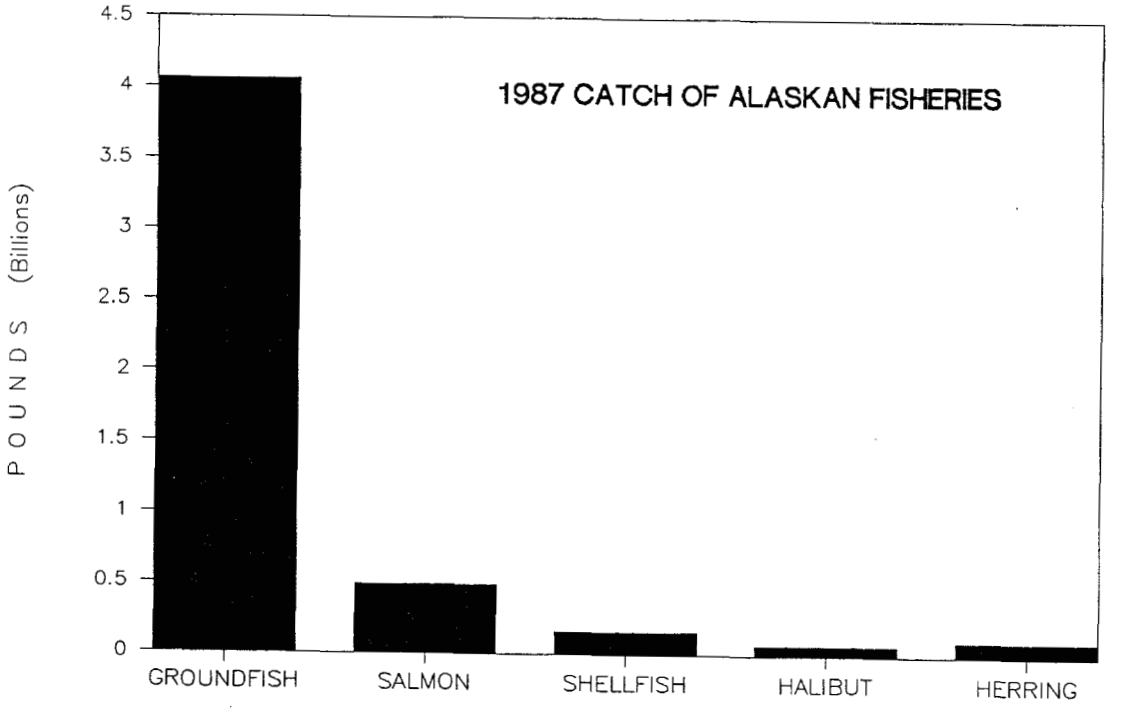

Figure 2. Catches of fish and shellfish in Alaskan waters in 1987.

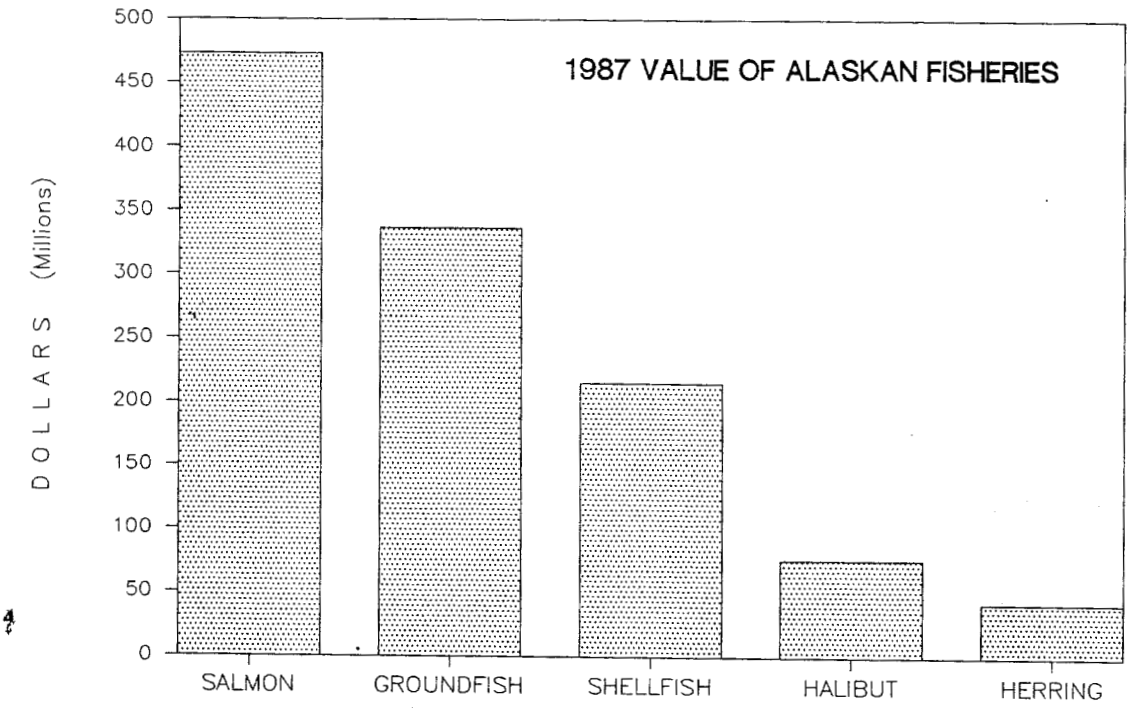

Figure 3. Ex-vessel value of fish and shellfish in Alaskan waters in 1987. (Source: NMFS statistics, 26 Feb. 1988)

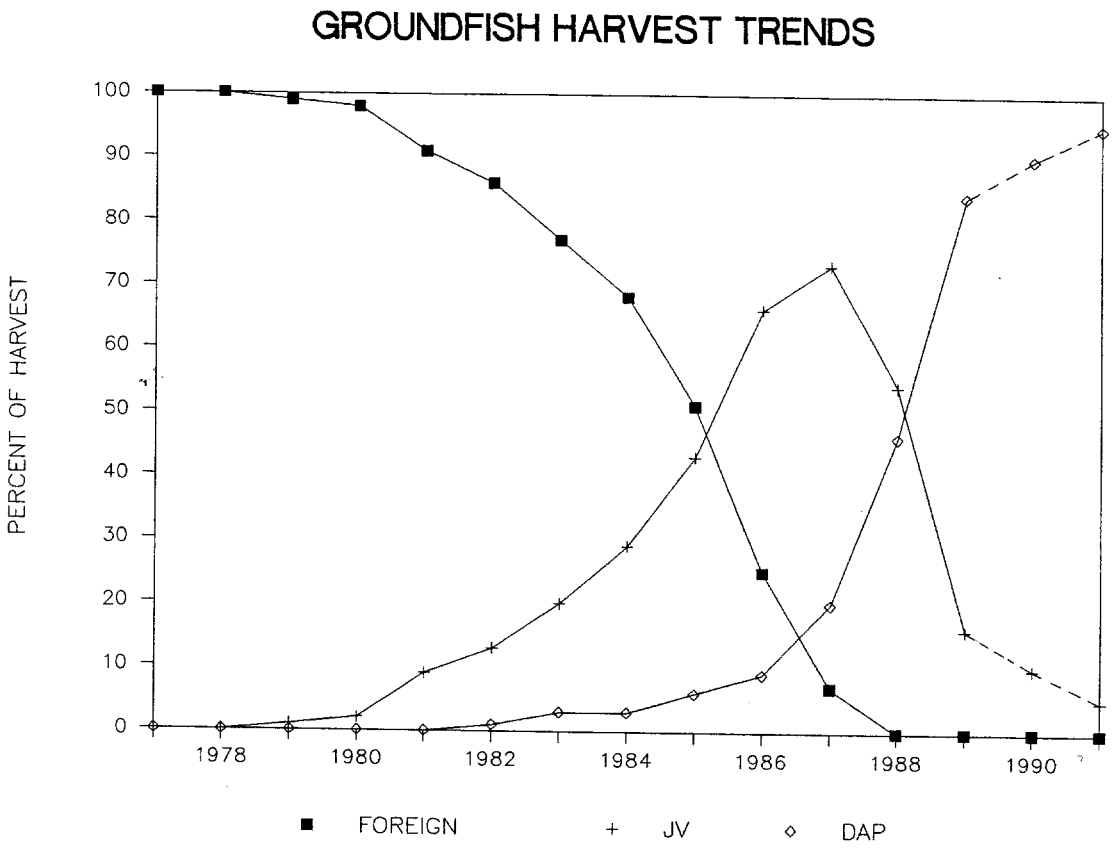

Figure 4. Annual changes in the harvest of Alaskan groundfish by foreign, Joint Venture (JV), and domestic (DAP) segments of the fishery. Data through 1989 were derived from the North Pacific Fishery Management Council. Data beyond 1989 are hypothetical.

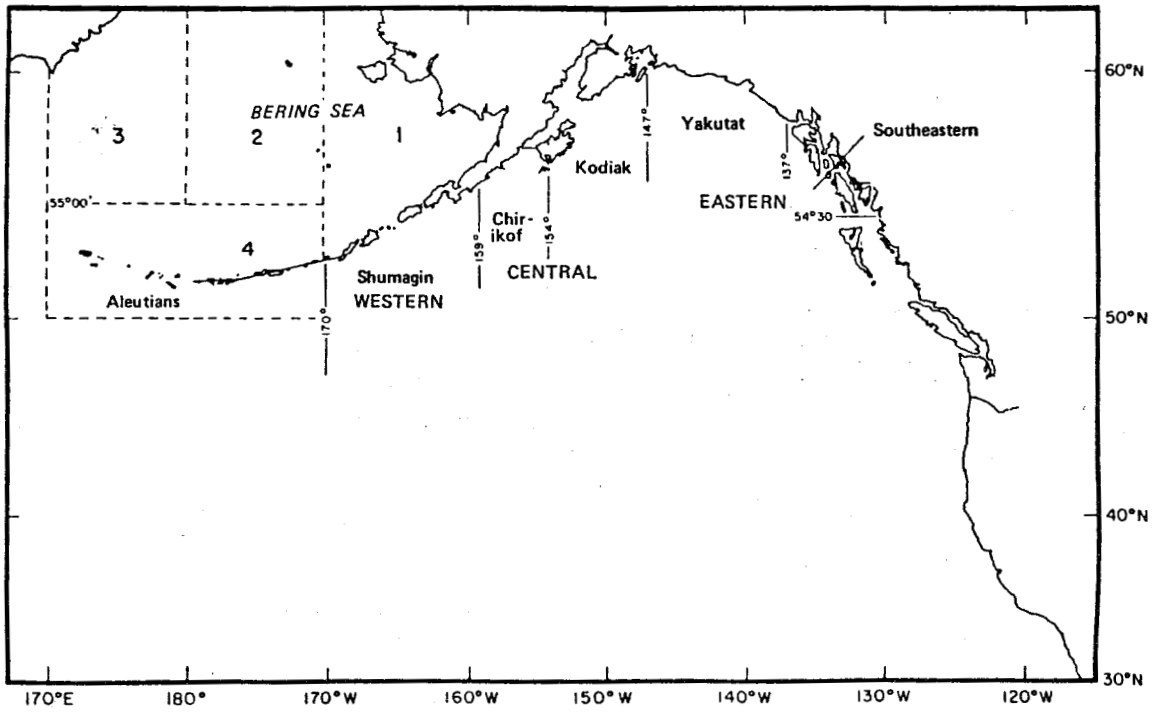

Figure 5. Statistical and management areas within the Gulf of Alaska and Bering Sea.

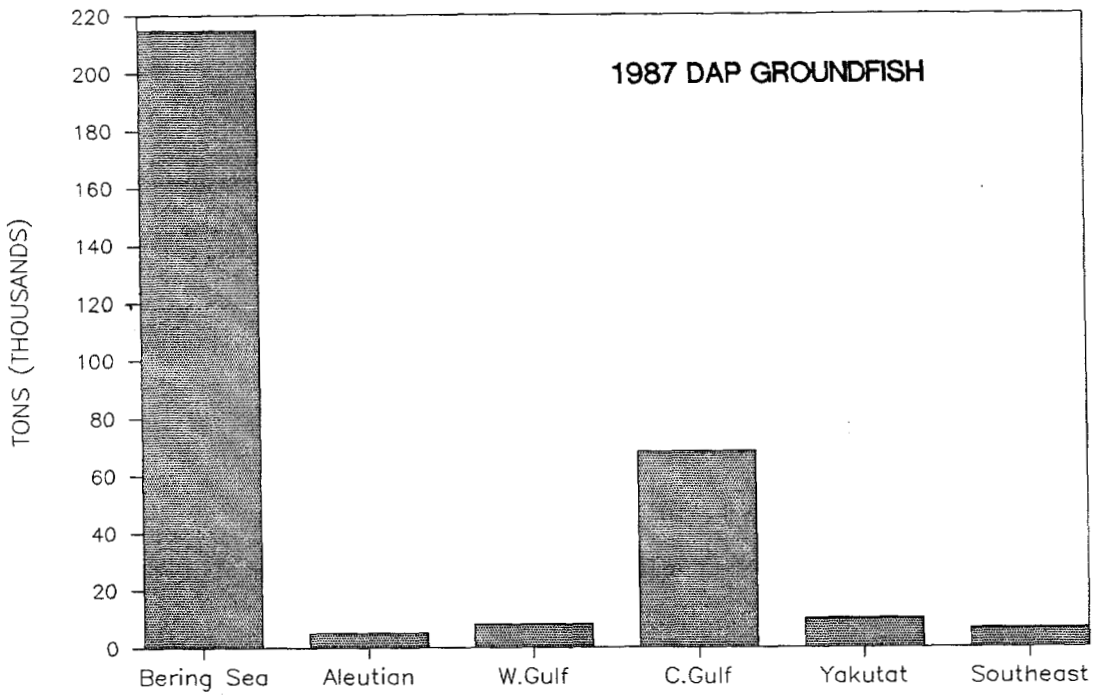

Figure 6. Groundfish landings in 1987 per Alaskan region.

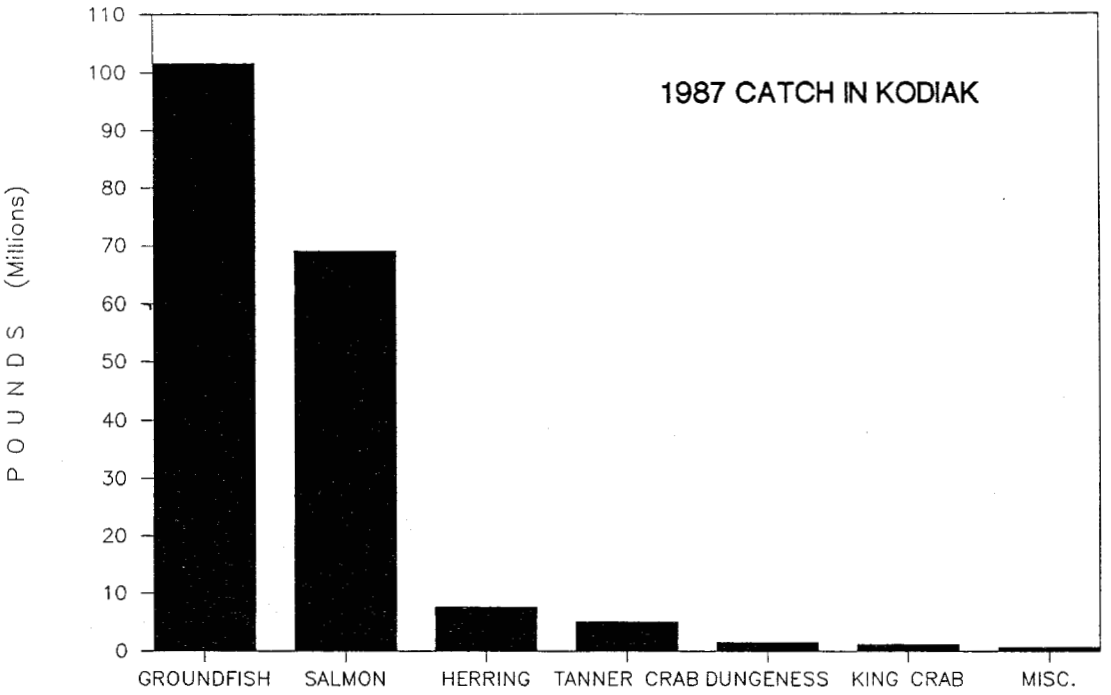

Figure 7. Kodiak catches of fish and shellfish in 1987. (Source: Westward Region Shellfish Report to the Alaska Board of Fisheries)

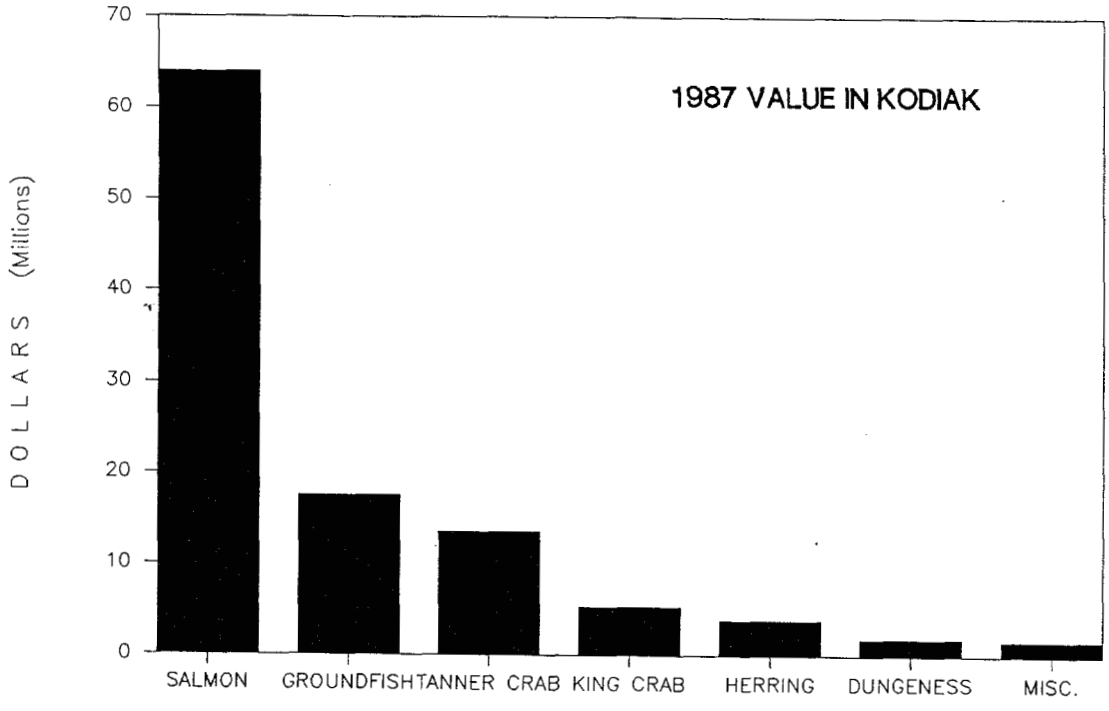

Figure 8. Value of fish and shellfish landed at Kodiak in 1987. (Source: Westward Region Shellfish Report to the Alaska Board of Fisheries)

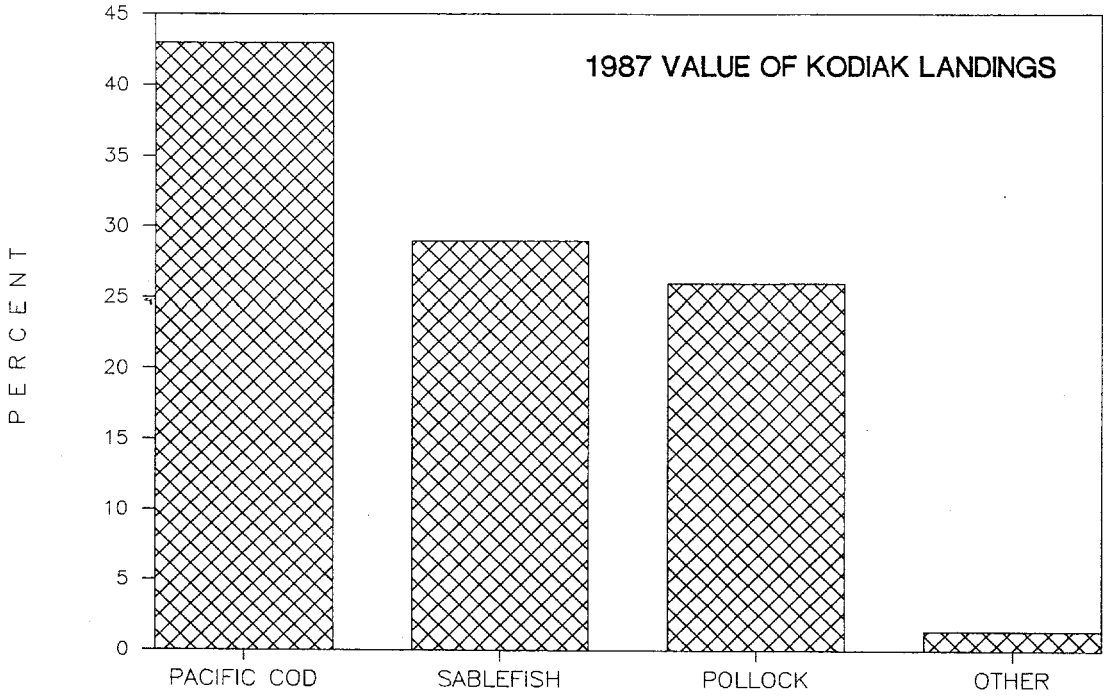

Figure 9. Percentage of total groundfish revenue at Kodiak ($17.6 million in 1987) contributed by various groundfish species. (Source: ADF&G fishticket database)

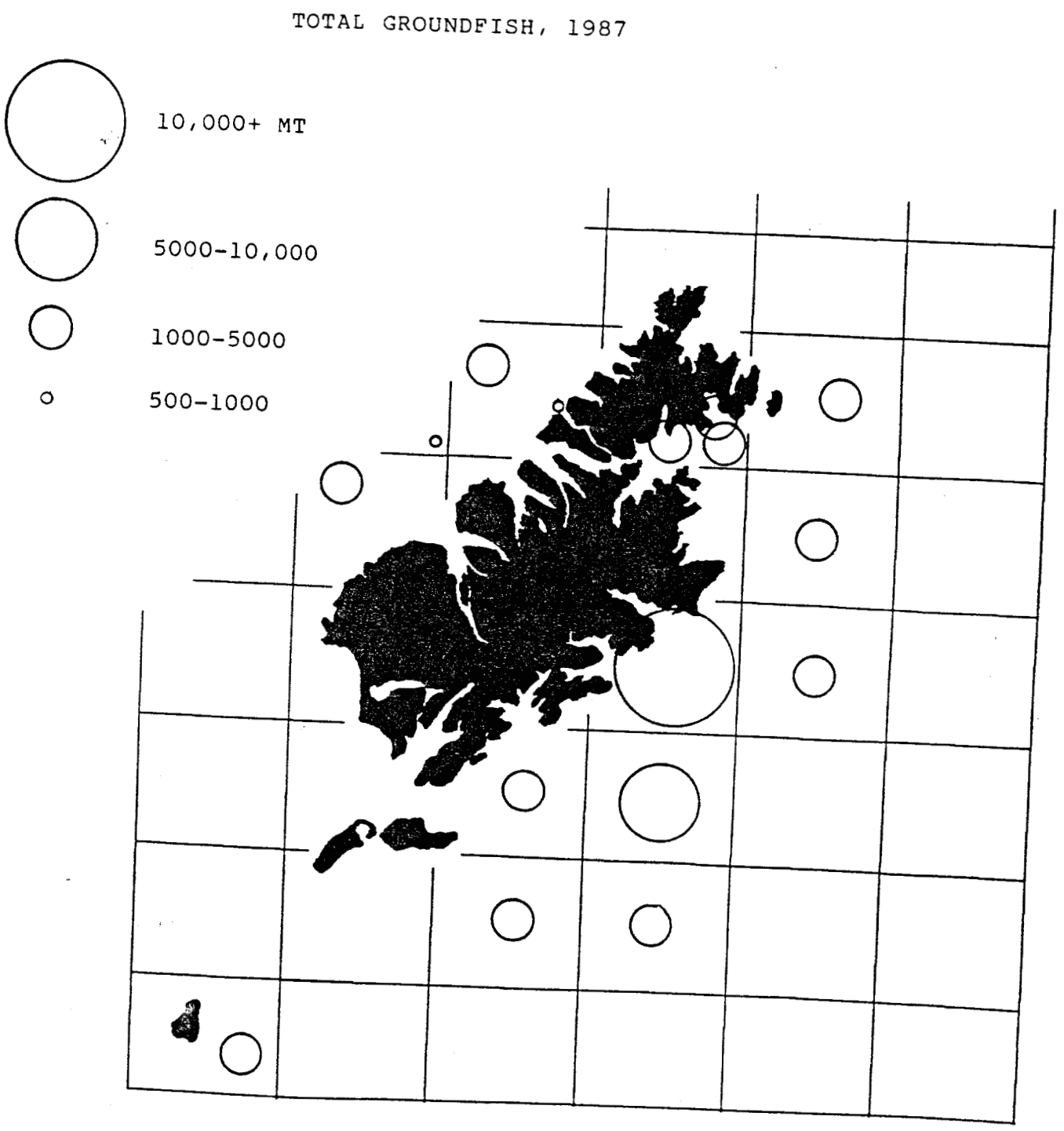

Figure 10. Total domestic (DAP) trawl catch of groundfish (species combined) in the Kodiak area in 1987, including both shore-based deliveries and catcher-processors.

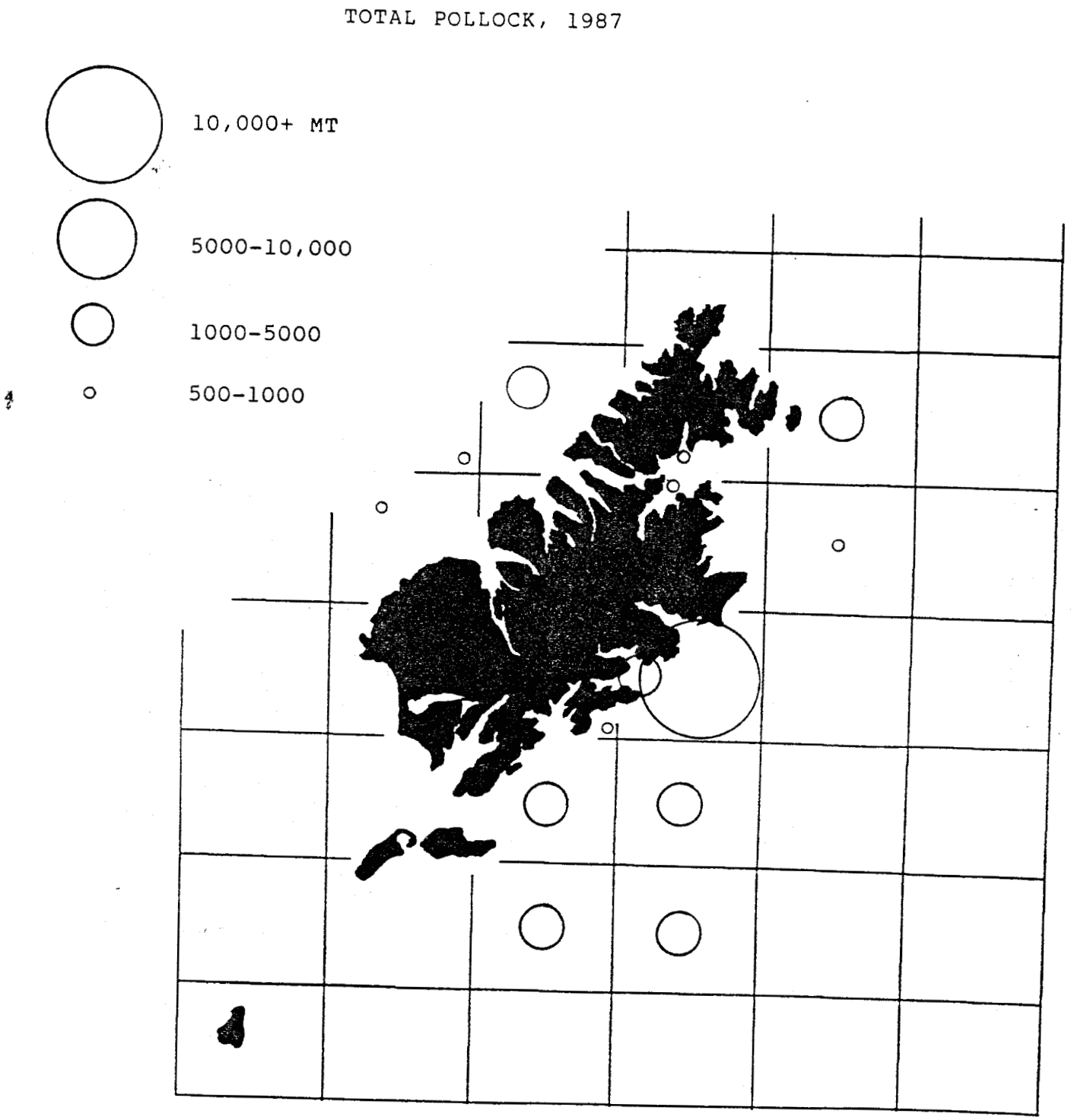

Figure 11. Total domestic (DAP) trawl catch of pollock in the Kodiak area in 1987, including both shore-based deliveries and catcher-processors.

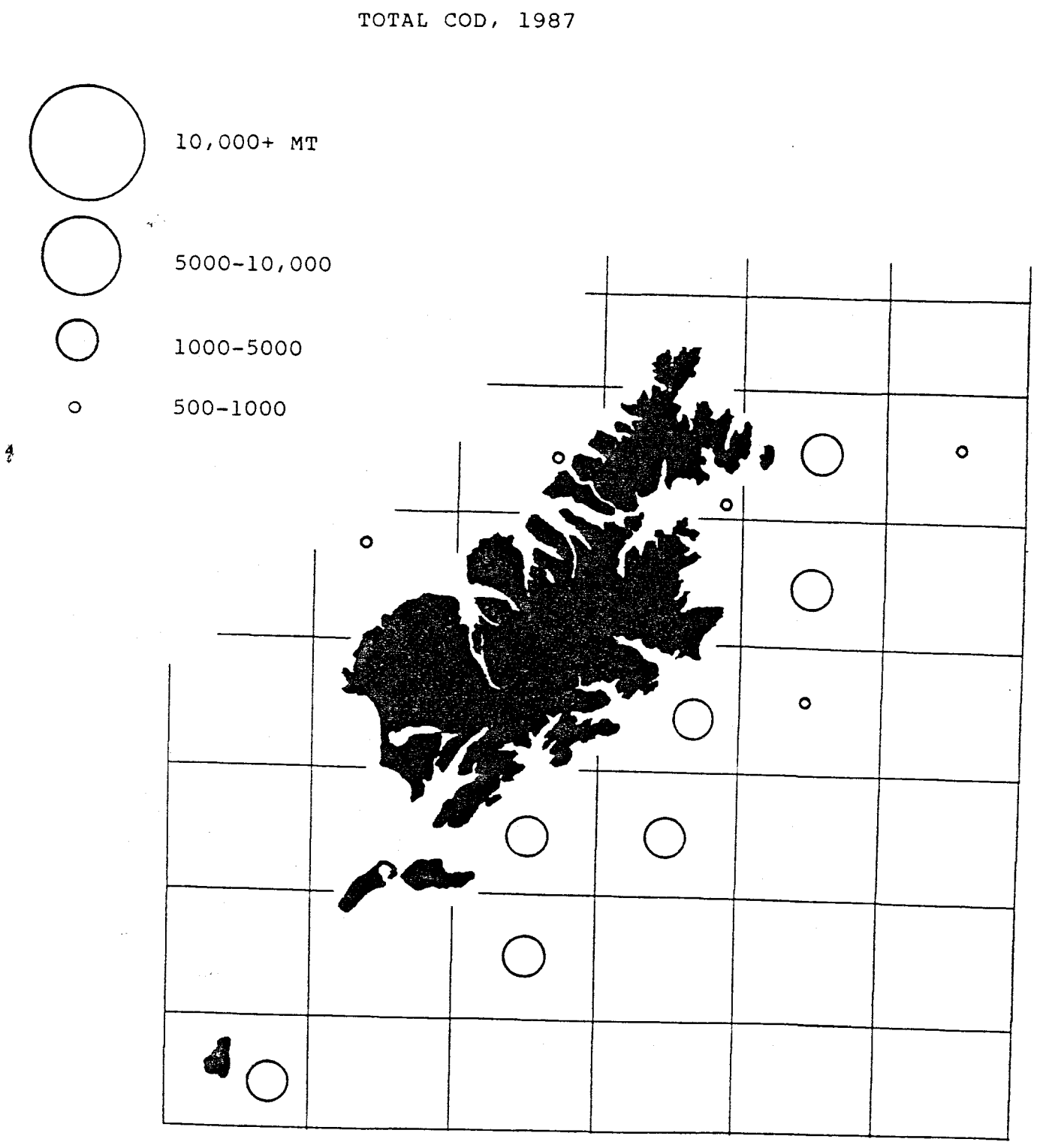

Figure 12. Total domestic (DAP) trawl catch of Pacific cod in the Kodiak area in 1987, including both shore-based deliveries and catcher-processors.

TOTAL FLATFISH, 1987

(note different scale)

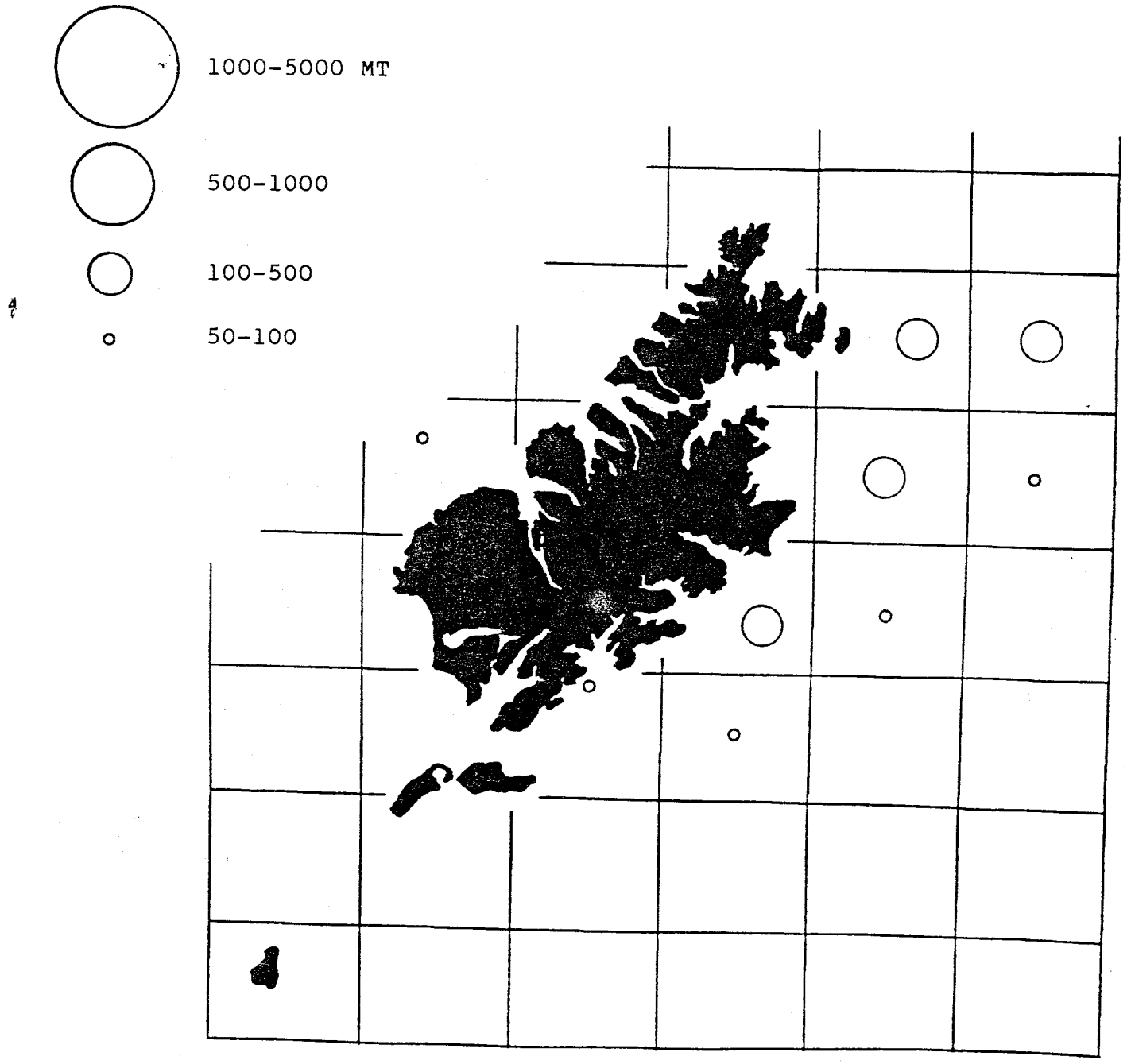

Figure 13. Total domestic (DAP) trawl catch of flatfish (species combined) in the Kodiak area in 1987, including both shore-based deliveries and catcher-processors.

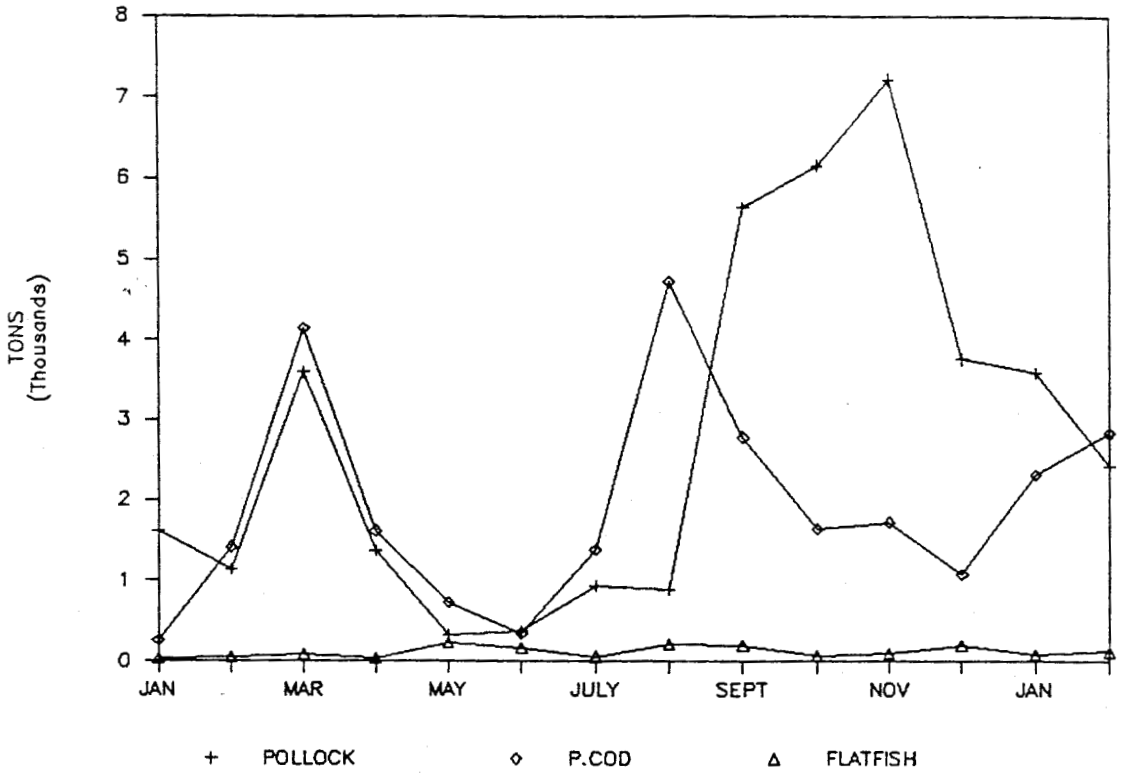

Figure 14. Monthly trawl catches of DAP groundfish in the Kodiak area, January 1987 through February 1988.

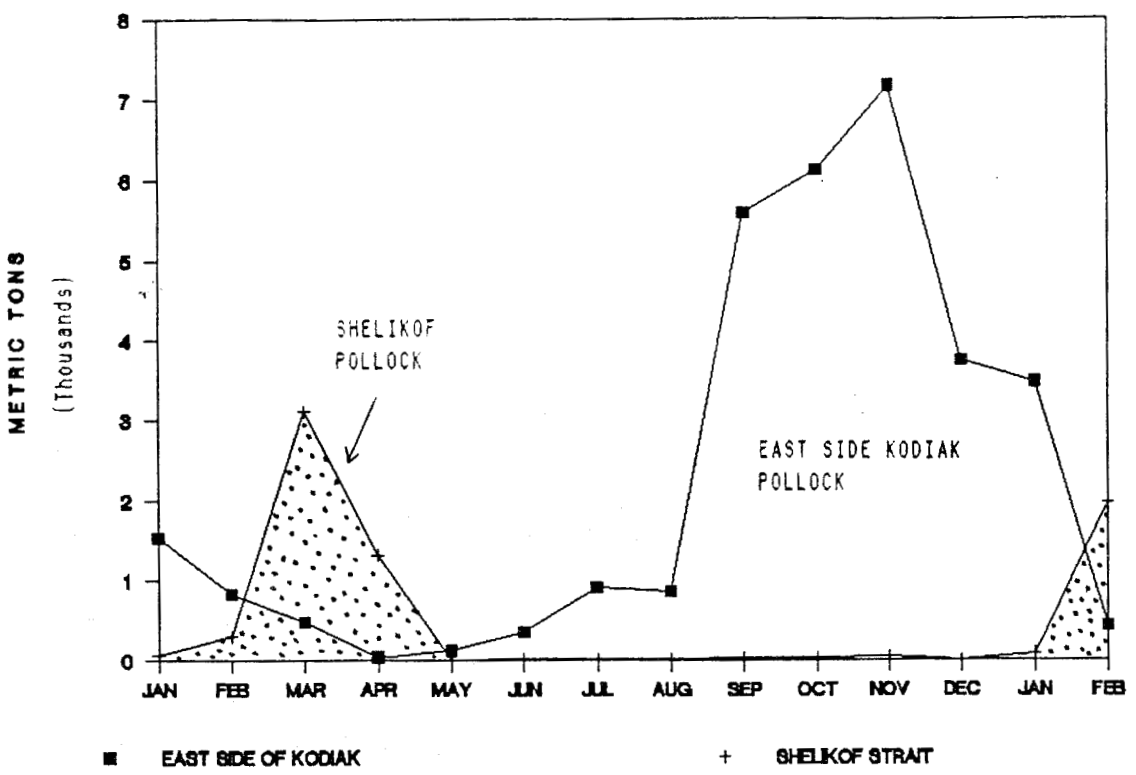

Figure 15. Fishing location for the domestic harvest of pollock in the Kodiak area (32,733 mt in 1987, shore-based deliveries and catcher-processors combined). Data source: ADF&G fishticket database, statistical areas 500000 thru 565000, Jan. 1987 - Feb. 1988.

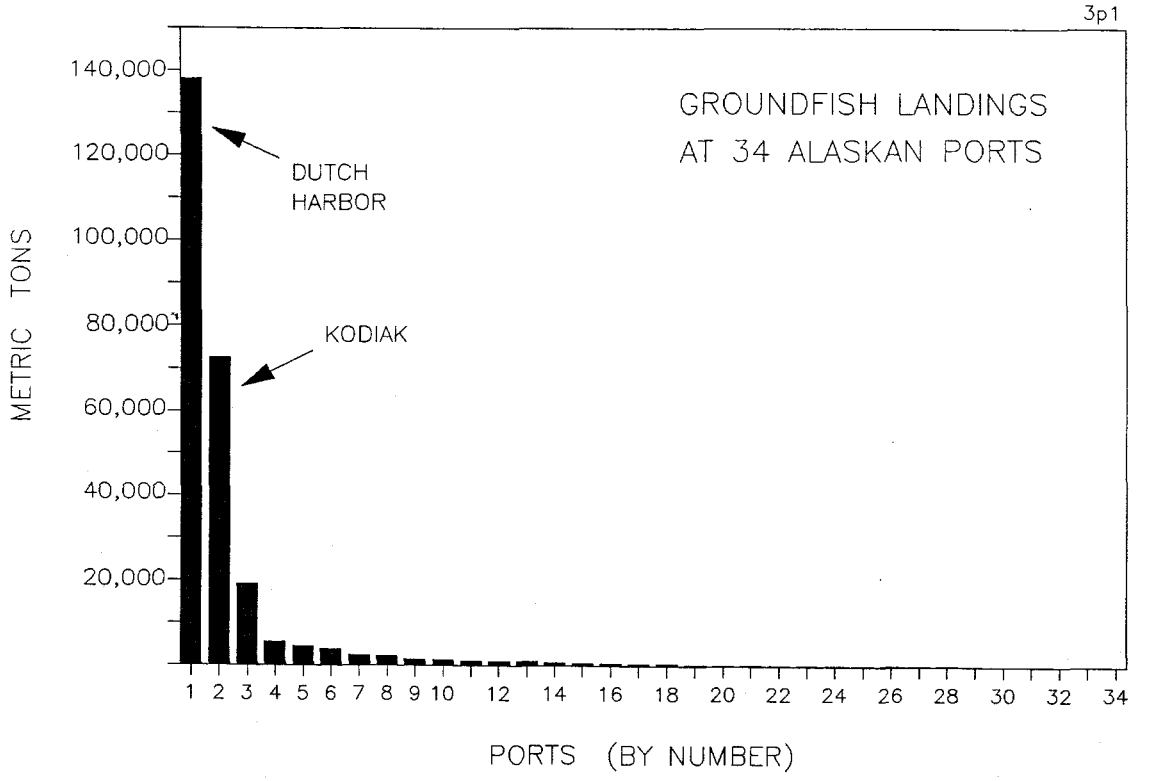

Figure 16. Grounfish landings by domestic shore-based vessels at 34 Alaskan ports, 1988. Halibut are not included. Source; NMFS fishticket database, 12/27/88.

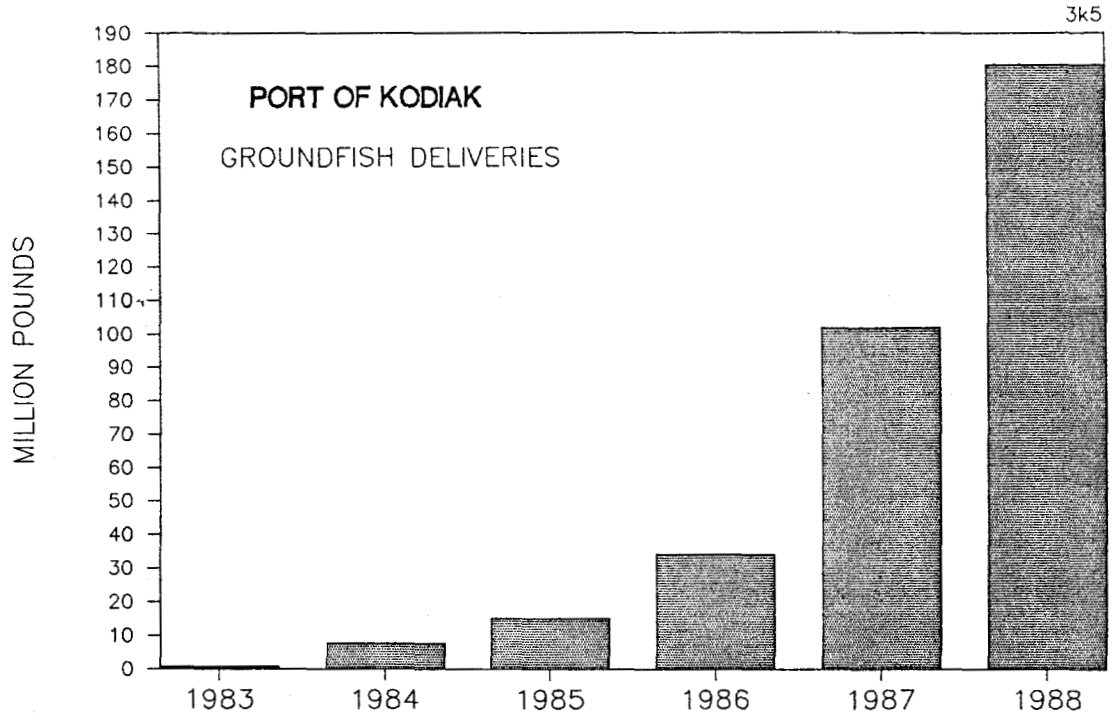

Figure 17. Groundfish deliveries by domestic shore-based vessels at the Port of Kodiak, 1983-1988. Halibut are not included. (Data sources: ADF&G annual shellfish reports; NMFS and ADF&G fishticket databases, 12/15/88)

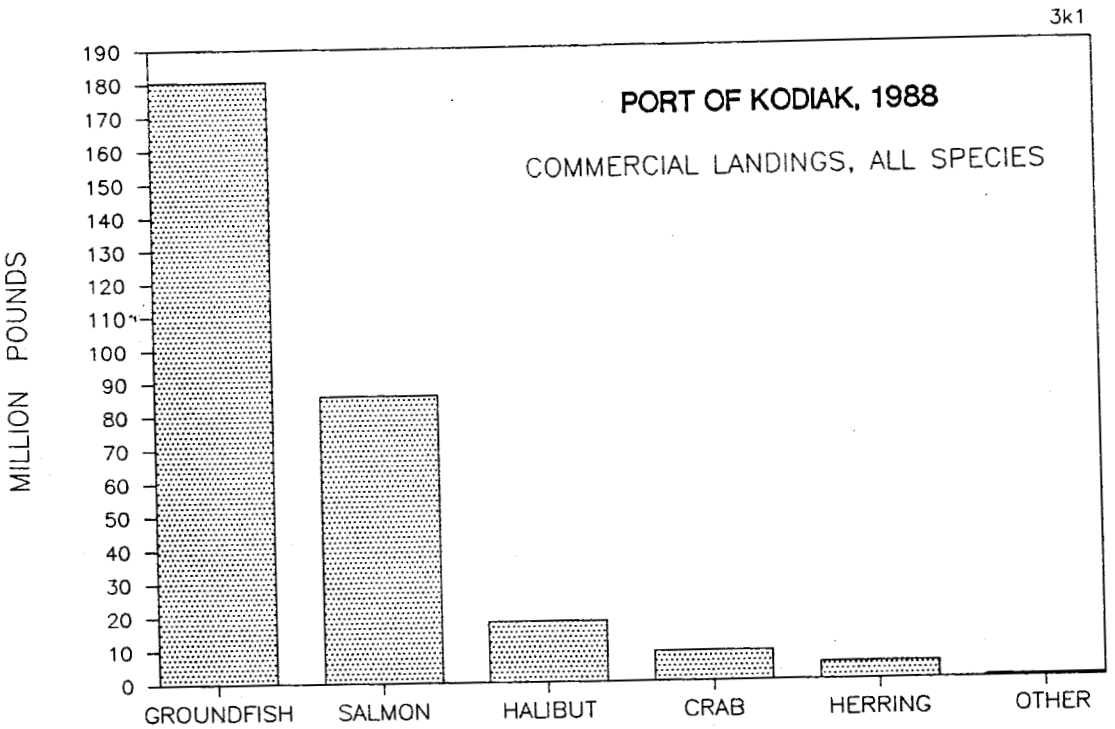

Figure 18. Fish and shellfish landings by domestic shore-based vessels at Kodiak, 1988. (Data sources: NMFS and ADF&G fishticket databases, 12/15/88)

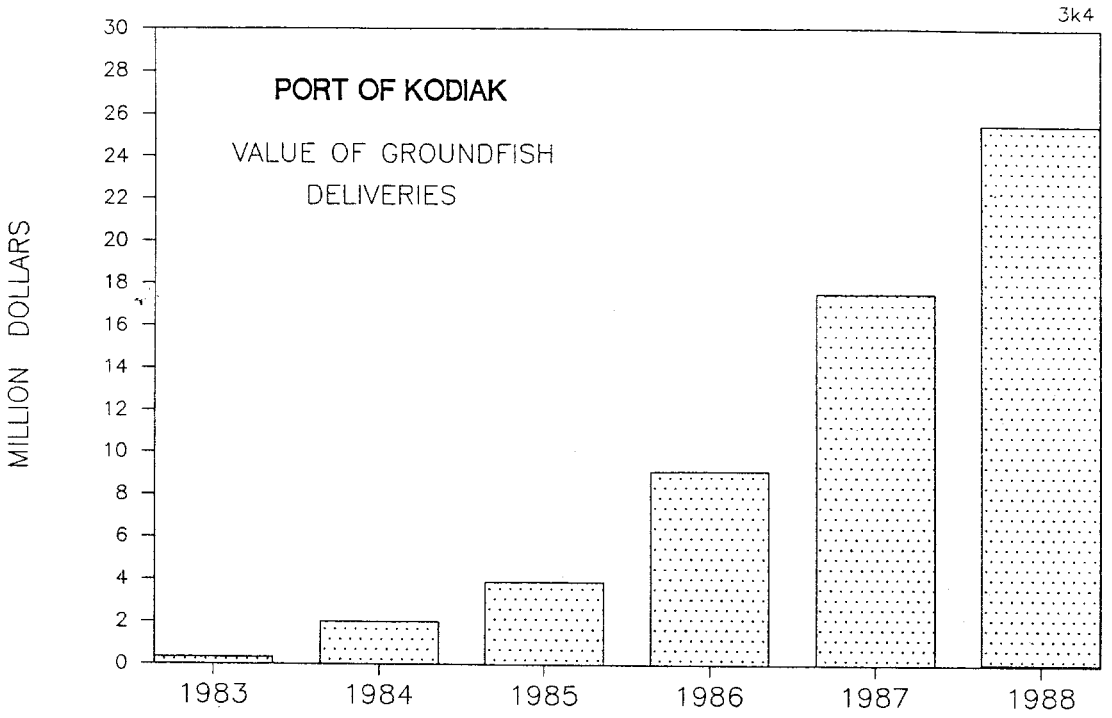

Figure 19. Ex-vessel value of groundfish landings at Kodiak by domestic shore-based vessels, 1983-1988. Halibut are not included. (Data sources: ADF&G annual shellfish reports; NMFS and ADF&G fishticket databases, 12/15/88)

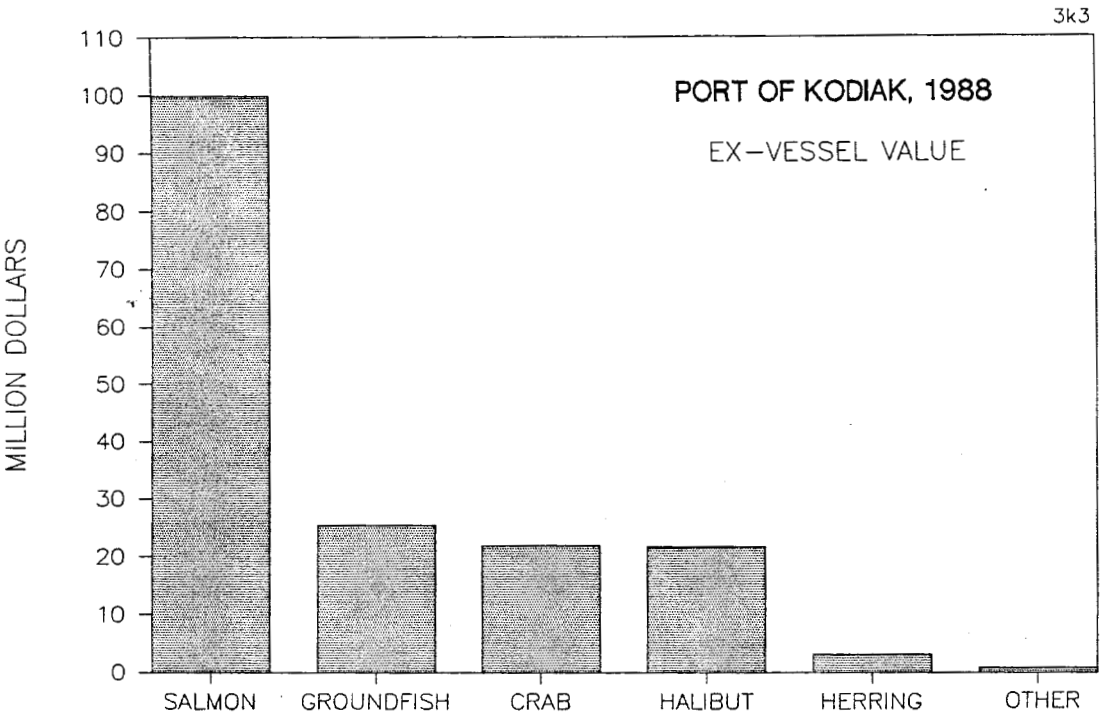

Figure 20. Ex-vessel value of fish and shellfish landings at Kodiak by domestic shore-based vessels, 1988. (Data sources: NMFS and ADF&G fishticket databases, 12/15/88)

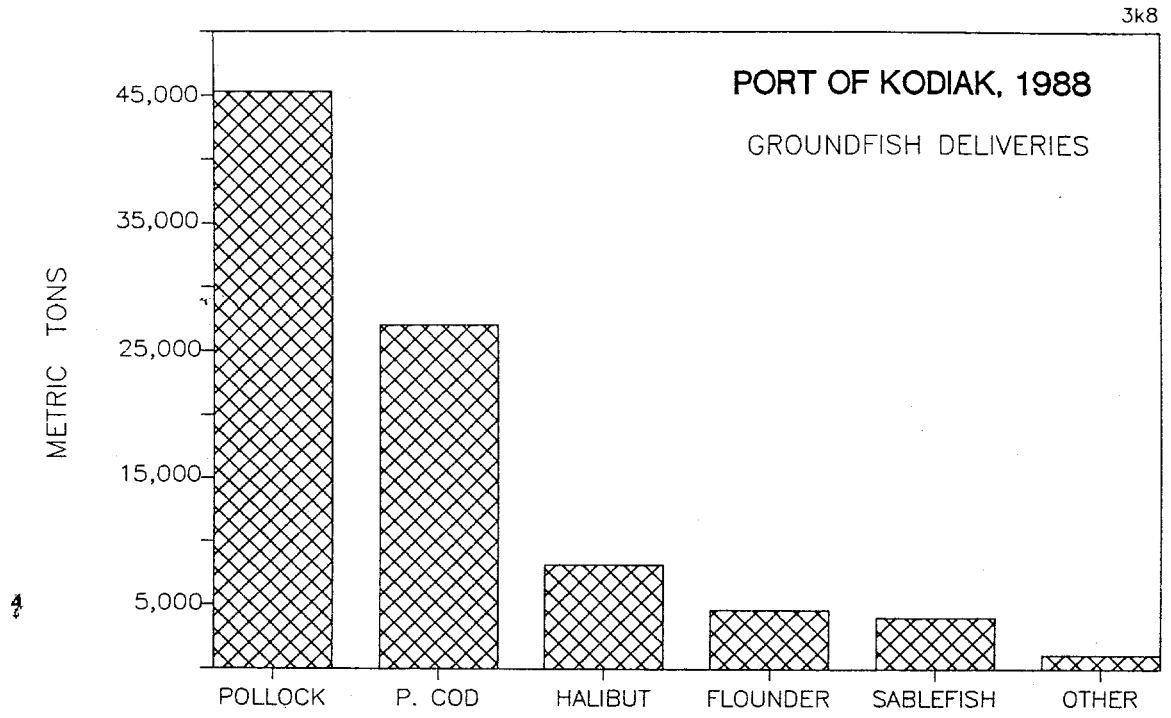

Figure 21. Groundfish landings by species, including halibut, at Kodiak in 1988. (Data sources: NMFS and ADF&G fishticket databases, 12/15/88)

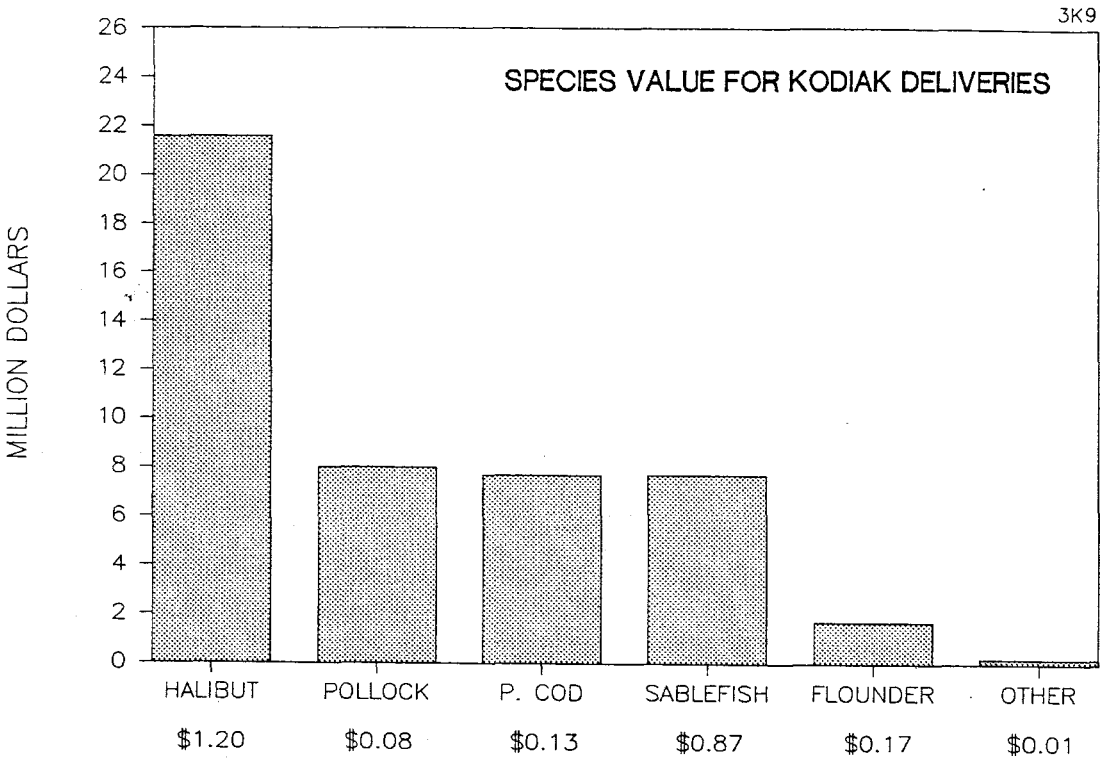

Figure 22. Ex-vessel value of groundfish species, including halibut, at Kodiak in 1988. Values were determined using the approximate price per pound for each species as indicated above.

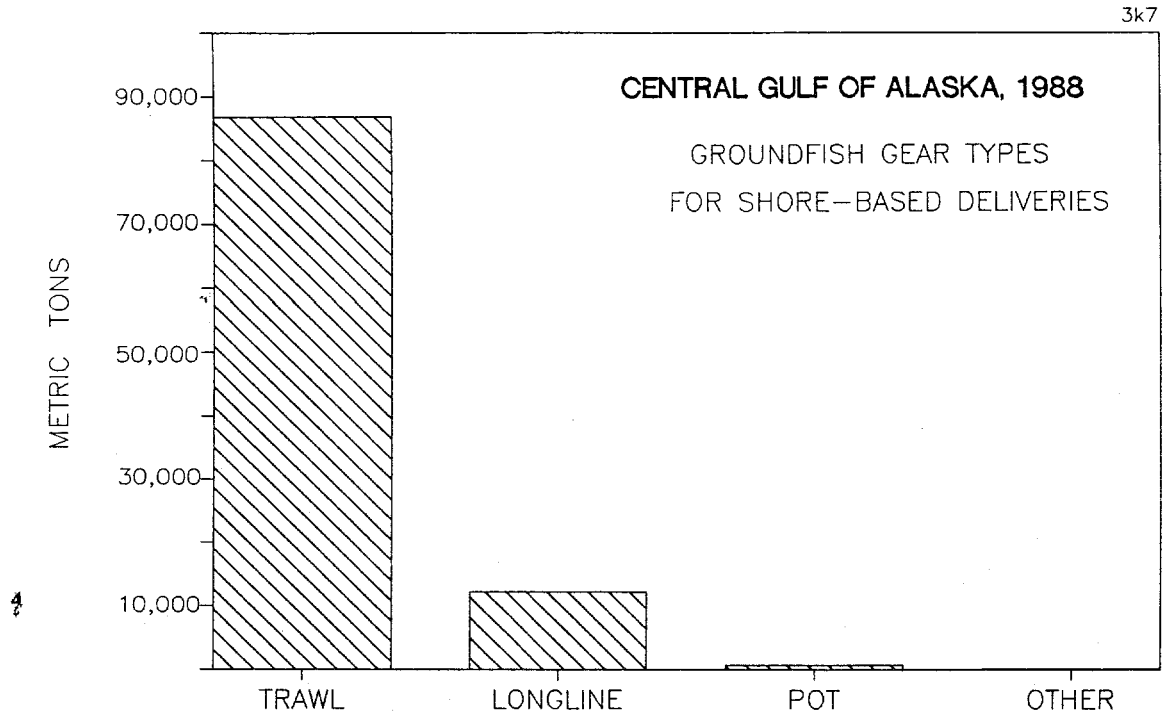

Figure 23. Groundfish landings by gear type at Kodiak, 1988. (Data sources: NMFS and ADF&G fishticket databases, 12/15/88)

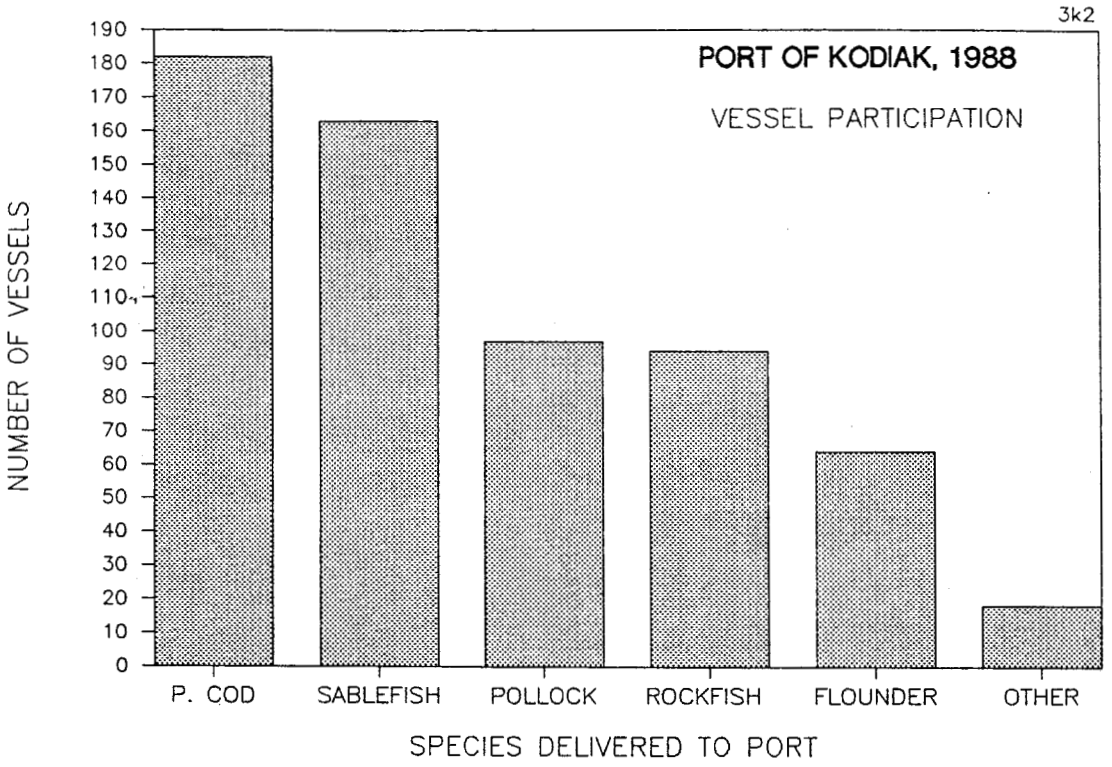

Figure 24. Number of domestic shore-based vessels that made deliveries of particular groundfish species to Kodiak in 1988. (Data source: NMFS fishticket database, 12/27/88)

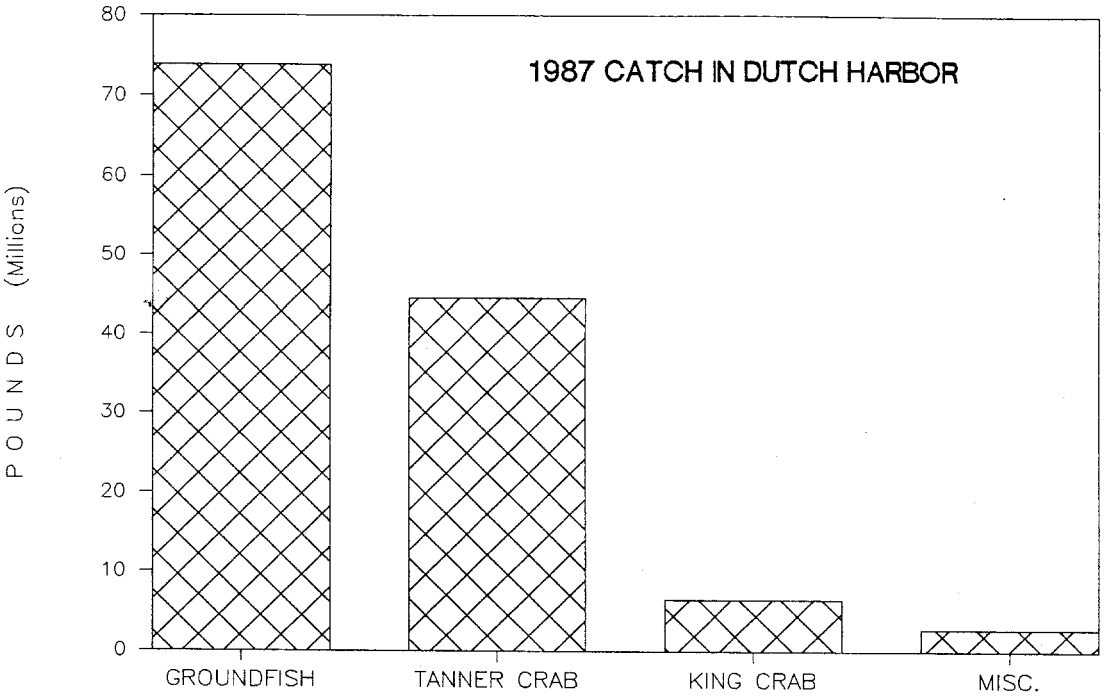

Figure 25. Dutch Harbor catches of fish and shellfish in 1987. (Source: Westward Region Shellfish Report to the Alaska Board of Fisheries)

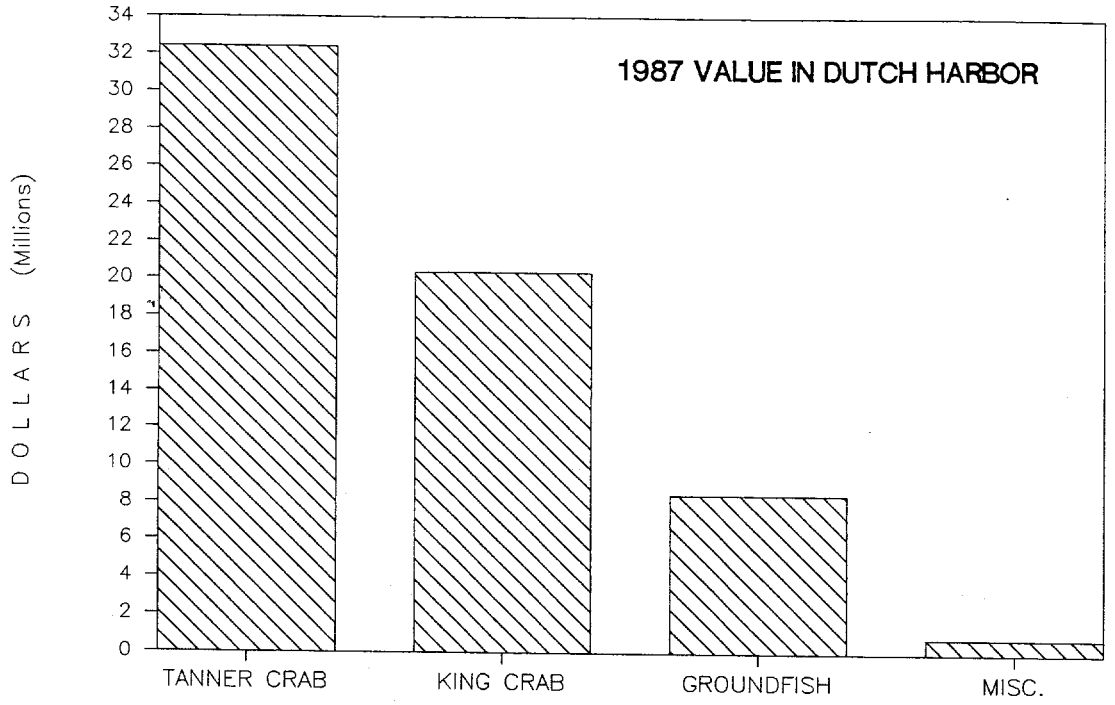

Figure 26. Value of fish and shellfish landed at Dutch Harbor in 1987. (Source: Westward Region Shellfish Report to the Alaska Board of Fisheries)

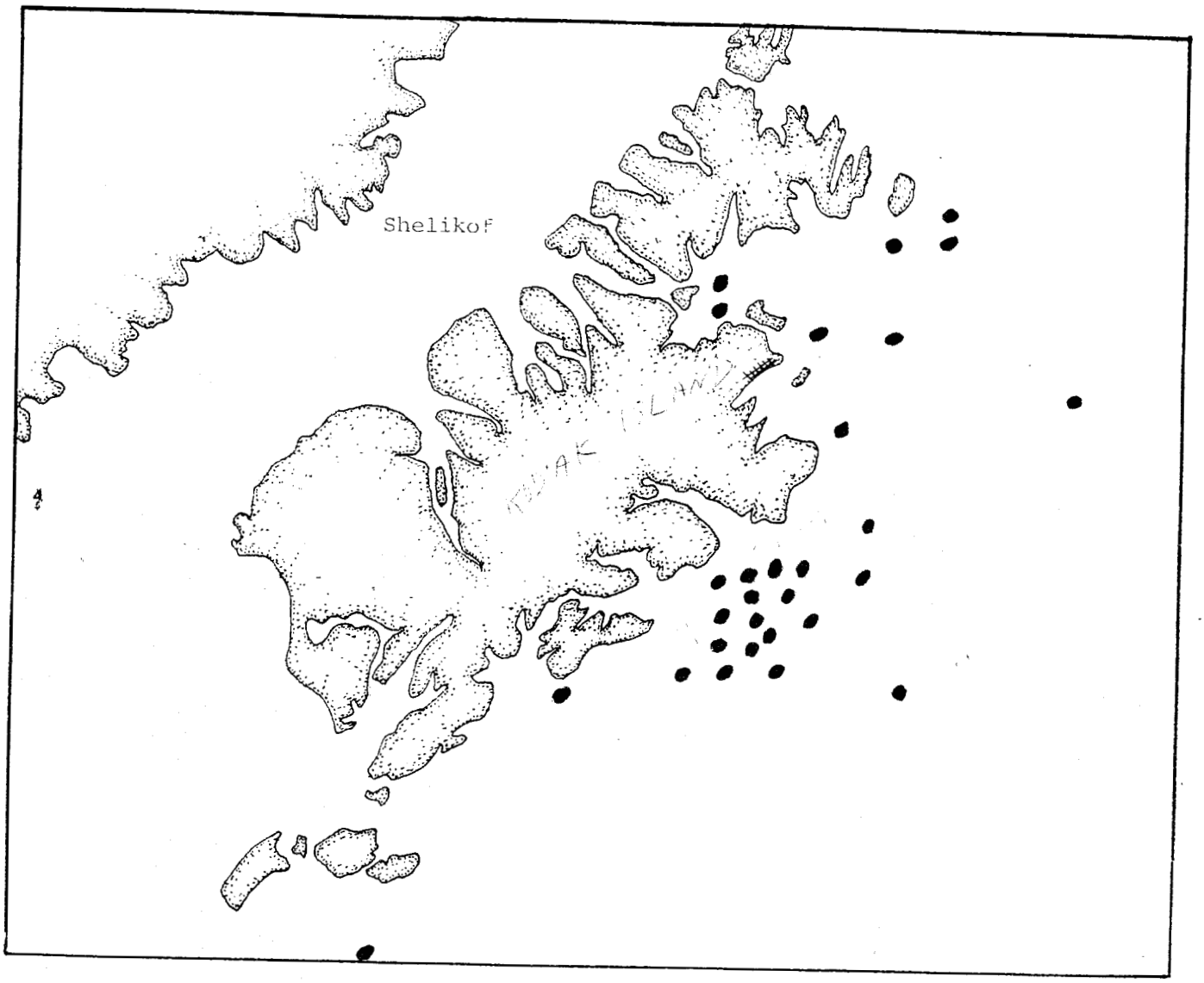

Figure 27. Approximate locations of ADF&G observer trips in the Kodiak area in 1987.

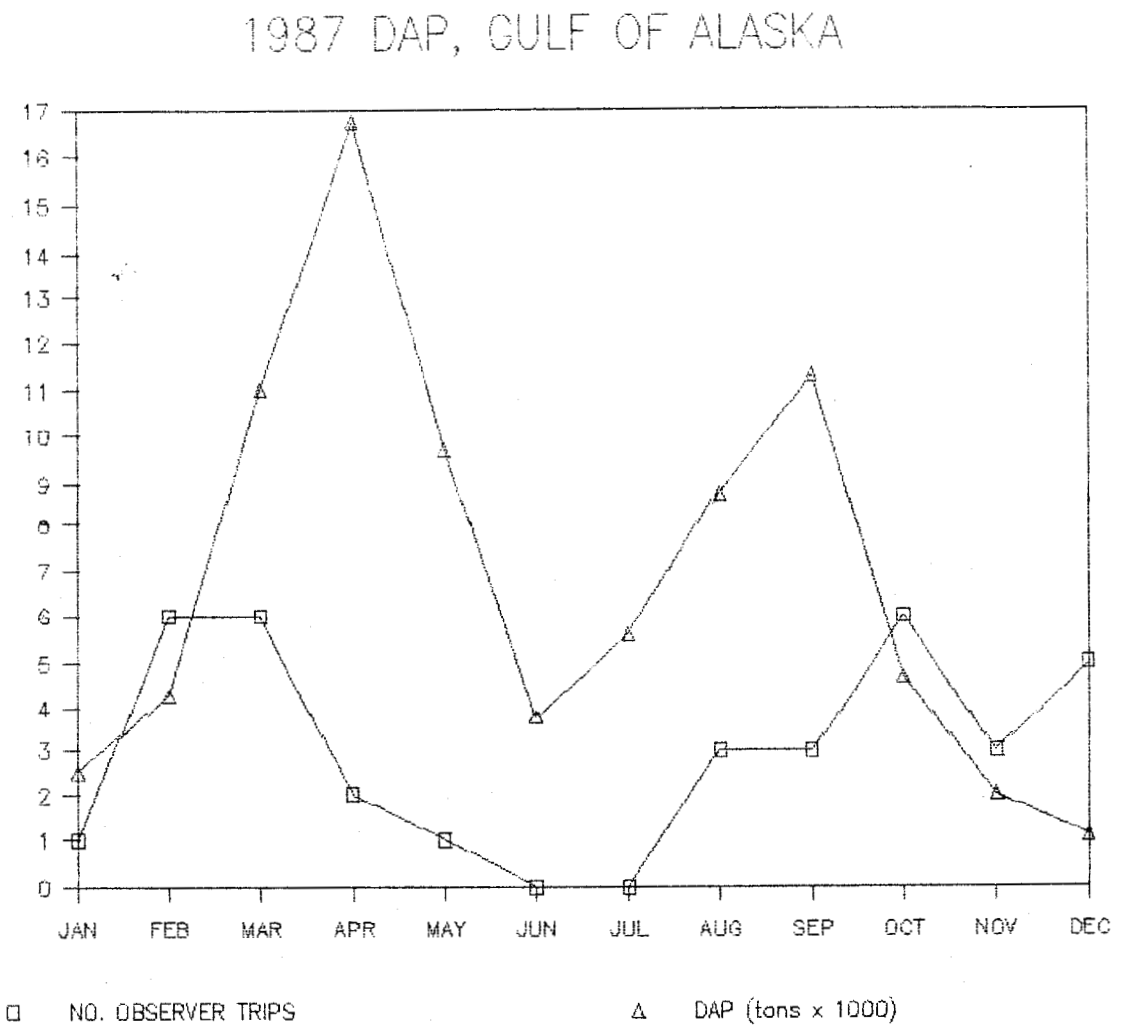

Figure 28. Monthly distribution of ADF&G observer trips and commercial landings (all gear types) in the Gulf of Alaska, 1987.

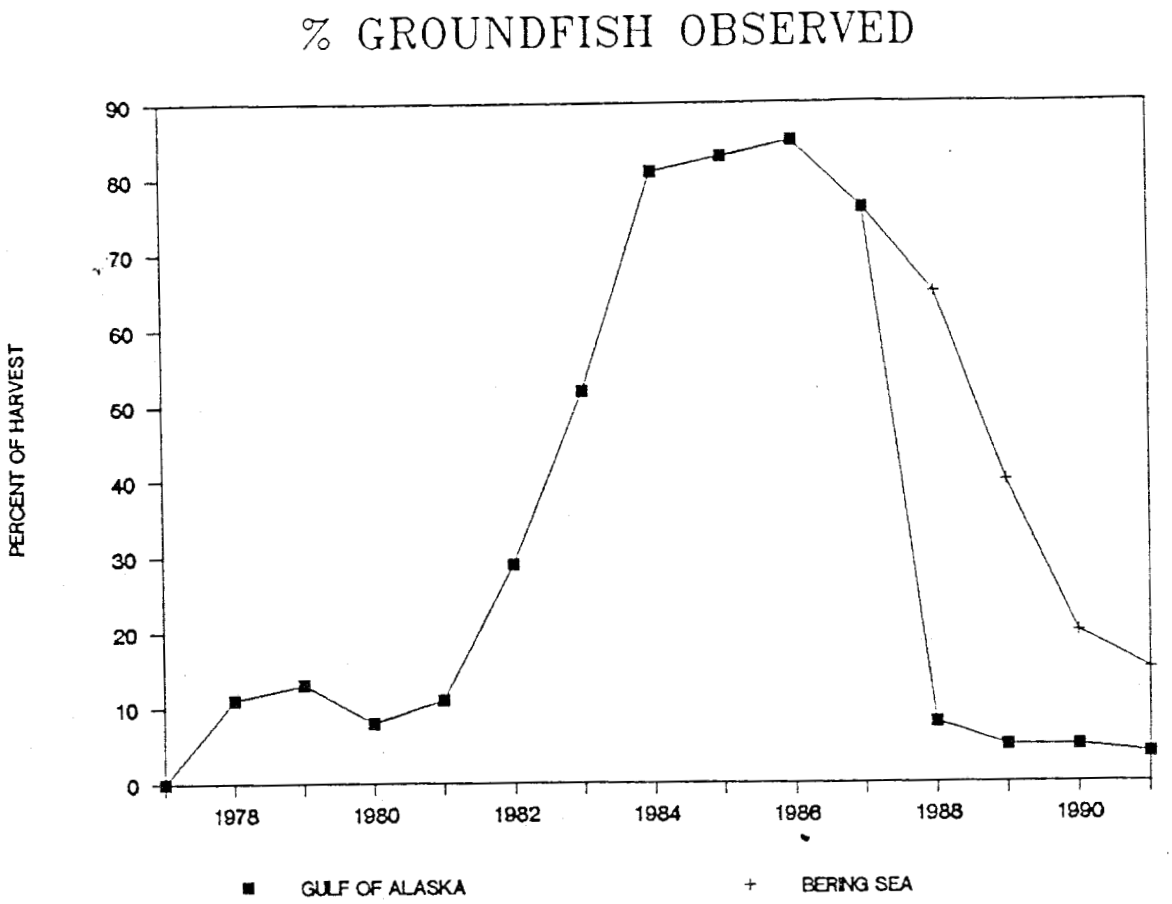

Figure 29. On-board observer coverage of the Alaskan groundfish fishery (DAP, JV, and TALFF combined). Data through 1987 were derived from the National Marine Fisheries Service and the Alaska Department of Fish and Game. Projections beyond 1987 are based on rates of observer coverage in 1987 and the projections shown in Fig. 1.

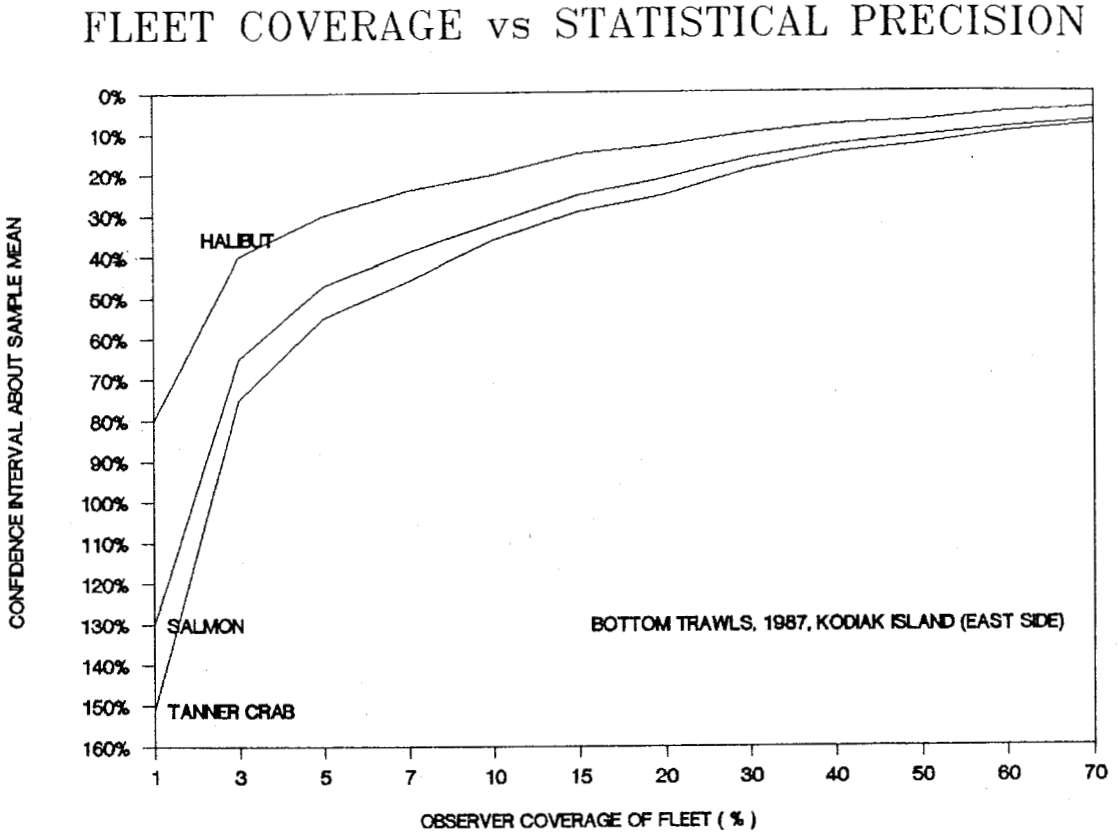

Figure 30. Relationship between observer coverage of the Kodiak bottom trawl fishery and the degree of statistical precision of the data obtained. This analysis is based on ADFG observer data obtained during 16 vessel trips in 1987. The graphs are species-specific because data variability differed for each species.

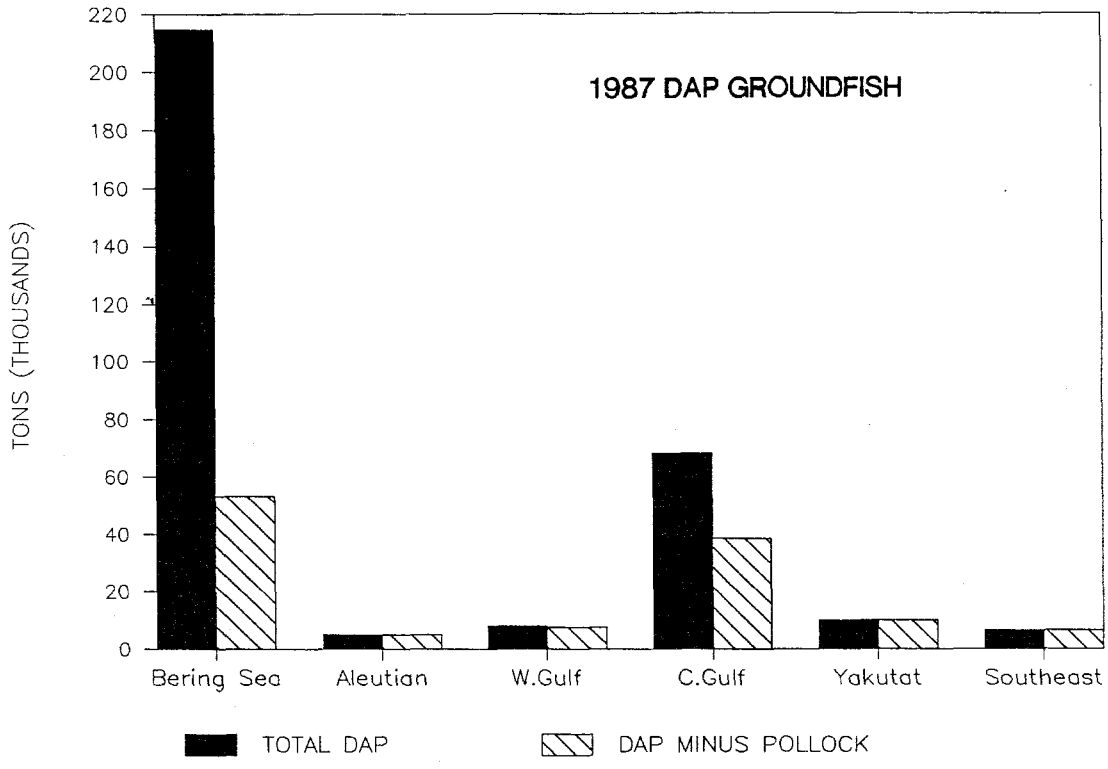

Figure 31. Groundfish landings in 1987 per Alaskan region.

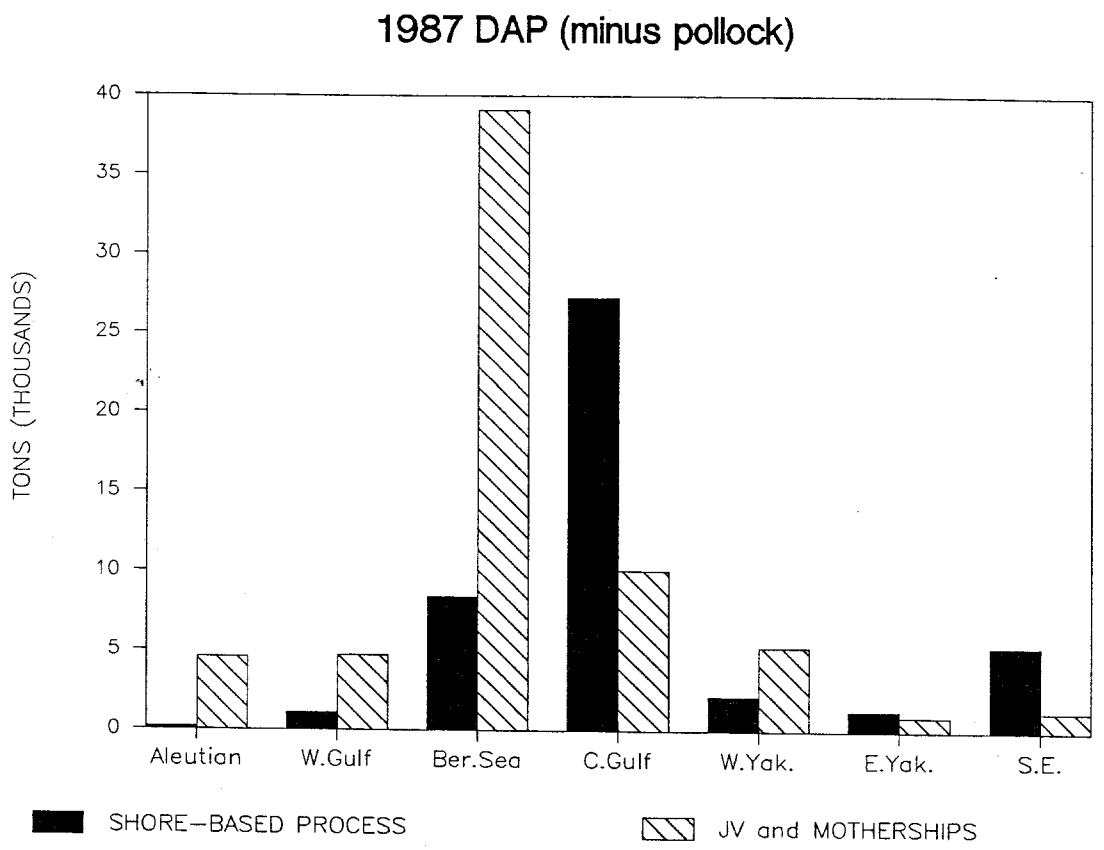

Figure 32. Groundfish deliveries (excluding pollock) to shore-based processors compared to catcher-processors and motherships.

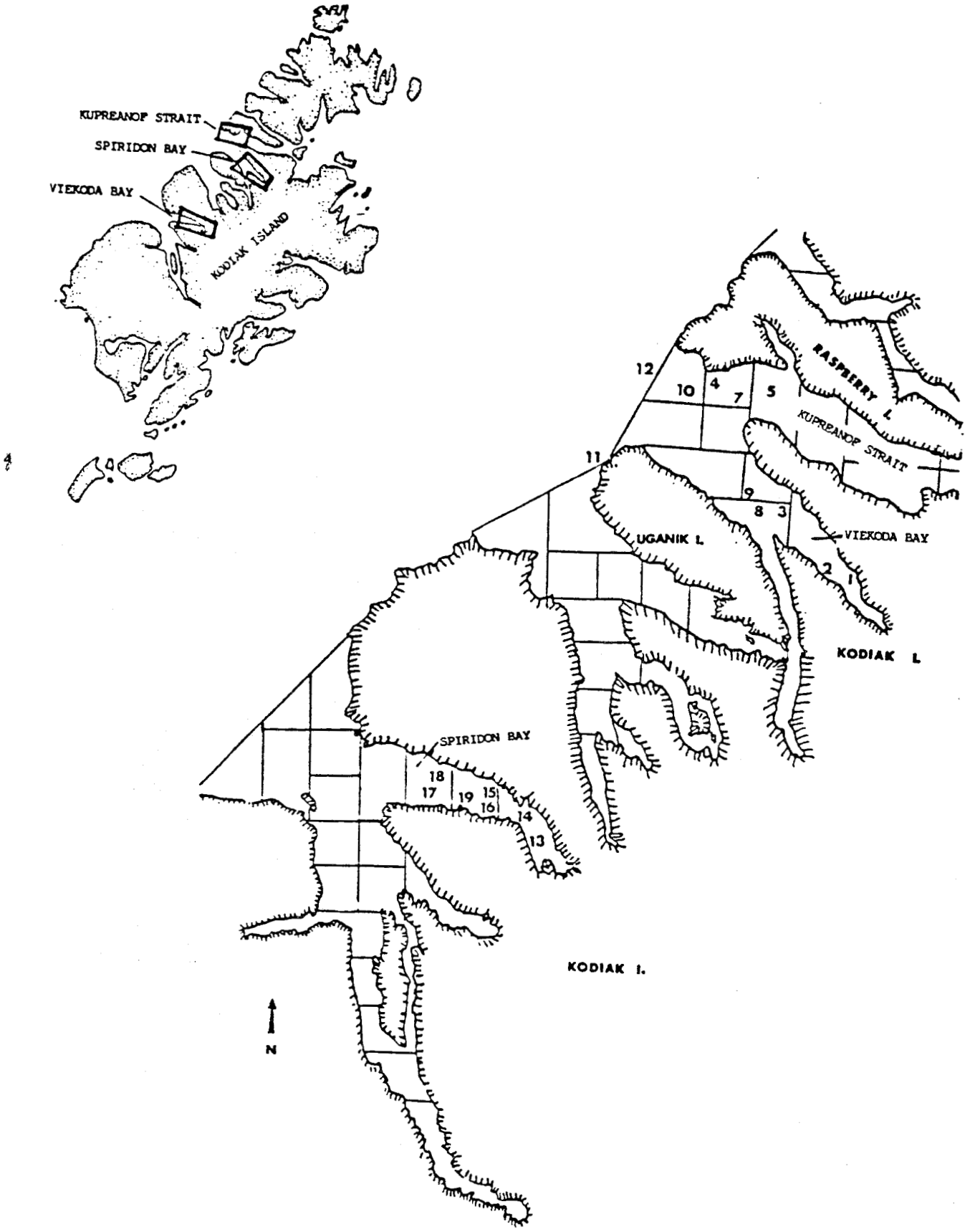

Figure 33. Sites on Kodiak's east side that were sampled during test fishery surveys.

Table 1. 1988 Alaska groundfish landings, all gears and processing types. Source: PacFIN, 10 Feb. 1989.

SPECIES	ALEUTIAN	BERING SEA	ALEUT&BS	W. GULF	C. GULF	YAKUTAT	SOUTHEAST	E. GULF	GULF	TOTAL
ARROWTOOTH FLOUNDER	19.1	57.3	76.4	4.1	203.9	9.6	0.4	10.0	217.9	294.3
UNSPECIFIED TURBOTS	22.2	2517.5	2539.7	-	-	-	-	-	-	2539.7
___TURBOTS	41.3	2574.8	2616.1	4.1	203.9	9.6	0.4	10.0	217.9	2834.1
ALASKA PLAICE	-	3.0	3.0	-	2.1	-	-	-	2.1	5.1
DOVER SOLE	-	-	-	-	928.2	-	TR	TR	928.2	928.2
ENGLISH SOLE	-	-	-	-	7.0	-	5.5	5.5	12.4	12.4
GREENLAND TURBOT	775.8	5730.7	6506.5	81.2	98.9	-	-	-	180.2	6688.7
REX SOLE	-	6.8	6.8	0.1	642.6	0.1	0.1	0.2	642.9	649.7
ROCK SOLE	25.6	22032.2	22057.8	6.7	775.8	4.1	11.8	15.9	798.5	22856.2
STARRY FLOUNDER	-	-	-	-	90.6	-	267.8	267.8	358.4	358.4
YELLOWFIN SOLE	0.8	217134.5	217135.4	-	3.4	-	18.0	18.0	21.4	217156.8
OTHER FLATFISH	-	-	-	0.3	660.7	-	12.4	12.4	673.4	673.4
UNSP. FLATFISH	88.5	115690.5	115779.0	134.9	3036.7	31.2	0.3	31.5	3203.1	118982.1
___ALL FLATFISH	932.1	363172.5	364104.6	227.4	6449.9	45.0	316.3	361.3	7038.6	371145.2
BLACK ROCKFISH	-	-	-	-	114.0	38.7	26.2	64.9	178.9	179.1
BOCACCIO	-	-	-	-	-	TR	TR	TR	TR	TR
CANARY ROCKFISH	-	-	-	-	-	TR	4.1	4.1	4.1	4.2
DARKBLOTCHED ROCKFIS	-	-	-	-	0.1	TR	-	TR	0.1	0.1
DUSKY ROCKFISH	-	-	-	-	11.7	TR	2.3	2.4	14.1	14.1
OTHER DEMERSAL RKFSH	-	-	-	-	-	0.1	5.4	5.5	5.5	5.6
QUILLBACK ROCKFISH	-	-	-	-	0.1	1.0	162.2	163.2	163.3	164.4
REDBANDED ROCKFISH	-	-	-	-	0.1	2.7	5.4	8.0	8.1	8.1
REDSTRIPE ROCKFISH	-	-	-	-	-	-	TR	TR	TR	TR
ROSETHORN ROCKFISH	-	-	-	-	-	0.3	2.8	3.1	3.1	3.1
ROUGHEYE ROCKFISH	1.8	0.1	1.9	2.4	13.7	20.7	46.4	67.1	83.3	86.3
SHORTRAKER ROCKFISH	14.6	-	14.6	6.0	22.5	6.2	0.9	7.1	35.6	51.4
SILVERGREY ROCKFISH	-	-	-	-	-	0.3	1.4	1.7	1.7	1.7
UNSP. DEMERSAL RKFSH	27.3	24.6	51.9	160.9	217.0	TR	1.5	1.5	379.4	431.4
UNSP. PELAGIC RKFSH	-	9.5	9.5	198.8	334.8	81.4	0.2	81.6	615.1	624.6
UNSP. SLOPE RKFSH	7.5	11.5	19.0	2261.4	5904.9	4020.4	434.9	4455.3	12621.7	12640.7
YELLOWEYE ROCKFISH	6.3	2.2	8.5	5.3	85.8	56.1	535.1	591.3	682.4	693.7
YELLOWMOUTH ROCKFISH	-	-	-	-	-	-	0.2	0.2	0.2	0.2
YELLOWTAIL ROCKFISH	-	-	-	-	-	-	TR	TR	TR	TR
PACIFIC OCEAN PERCH	658.3	1455.1	2113.5	226.7	392.1	111.6	1.0	112.5	731.3	2844.8
UNSP. POP GROUP	1489.4	46.5	1535.8	-	3.8	-	-	-	3.8	1539.6
THORNYHEADS	149.4	180.2	329.6	757.9	1052.5	556.5	116.7	673.2	2483.6	2815.5
WIDOW ROCKFISH	-	-	-	-	-	-	TR	TR	TR	TR
UNSP. ROCKFISH	532.6	91.3	623.8	21.7	201.2	19.7	38.9	58.6	281.6	905.7
___ALL ROCKFISH	2887.2	1820.9	4708.0	3641.1	8354.4	4915.8	1385.8	6301.5	18297.0	23014.4
ATKA MACKEREL	21477.5	80.9	21558.4	67.8	0.2	-	-	-	68.1	21626.5
LINGCOD	-	-	-	-	11.0	32.7	252.7	285.5	296.5	297.3
PACIFIC COD	5219.1	191289.0	196508.1	5523.8	26465.6	39.5	253.7	293.2	32282.5	229794.1
SABLEFISH	3414.5	3187.9	6602.5	3476.7	13392.7	6754.9	7391.4	14146.3	31015.8	37664.1
WALLEYE POLLOCK	42380.9	1300405.9	1342786.9	4541.7	49302.1	0.6	1.6	2.2	53846.0	1396632.9
UNSP. ROUNDFISH	-	-	-	-	-	-	TR	TR	TR	TR
___ALL ROUNDFISH	72492.1	1494963.8	1567455.8	13610.0	89171.8	6827.8	7899.4	14727.2	117509.0	1685014.9
SPINY DOGFISH	-	-	-	-	-	-	16.9	16.9	16.9	17.0
UNSPECIFIED SQUID	3.0	195.1	198.2	4.6	-	3.0	-	3.0	7.6	205.8
OTHER GROUNDFISH	-	-	-	TR	4.4	9.5	146.1	155.6	160.0	160.9

THIS REPORT INCLUDES ONLY DATA FOR NORTH PACIFIC COUNCIL INPFC AREAS
TR => LANDED CATCH LESS THAN 0.05 METRIC TONS, OR METRIC TONS PER UNIT OF EFFORT LESS THAN 0.005

Table 2. Annual domestic groundfish catches (mt) in the western Gulf of Alaska and Bering Sea by species group, FMP area, and year: 1979-1988. (Source: ADF&G fish ticket database and PACFIN)

Species	FMP Area	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Pacific Cod	Cent. Gulf	857	461	795	1910	4105	2148	2084	5442	22540	24805
	West. Gulf	0	71	239	292	142	45	777	386	2129	5524
	Aleutians	2	0	5259	5214	4000	391	460	10	151	1866
	Bering Sea	585	2401	8979	19586	37356	33856	39384	34825	31733	84867
Pollock	Cent. Gulf	1465	479	561	2186	117	330	6920	16104	29740	49150
	West. Gulf	0	1	0	61	5	0	8458	713	4187	4542
	Aleutians	0	0	58	48	71	12	45	745	0	1682
	Bering Sea	0	114	177	88	880	6669	27961	51024	166796	514878
Sablefish	Cent. Gulf	48	19	6	19	251	2756	3769	7774	9732	13357
	West. Gulf	0	1	0	0	10	240	1955	2754	3304	3376
	Aleutians	0	0	0	29	25	3	1315	2640	3042	3409
	Bering Sea	0	2	2	148	26	1012	1959	2734	3617	3176
Flounder	Cent. Gulf	32	13	52	18	61	240	254	942	1438	4670
	West. Gulf	0	0	0	0	7	5	10	235	86	227
	Aleutians	0	0	0	0	0	0	22	1081	1227	818
	Bering Sea	0	44	0	5	3	8	25	4283	9837	34718
Pacific Ocean Perch	Cent. Gulf	0	2	6	2	0	0	13	47	631	6334
	West. Gulf	0	0	0	0	7	116	631	254	264	2497
	Aleutians	0	0	0	0	0	2	93	0	16	675
	Bering Sea	0	0	0	9	8	1240	716	378	659	1455
Rockfish	Cent. Gulf	5	31	62	10	16	43	216	535	810	965
	West. Gulf	0	0	0	0	4	0	80	125	412	387
	Aleutians	0	0	0	0	0	0	66	25	61	58
	Bering Sea	0	0	0	3	0	38	49	57	458	123
Thornyheads	Cent. Gulf	0	0	0	0	0	1	22	278	1008	1053
	West. Gulf	0	0	0	0	0	8	6	86	322	758
	Aleutians	0	0	0	0	0	0	17	21	93	149
	Bering Sea	0	0	0	0	0	7	6	103	166	180
Atka Mackeral	Cent. Gulf	8	0	0	0	0	0	0	0	0	0
	West. Gulf	0	0	0	0	0	31	0	0	0	68
	Aleutians	0	0	0	0	0	0	0	2	0	1908
	Bering Sea	2	0	0	0	0	0	0	2	0	39
Other	Cent. Gulf	228	364	128	50	44	1	47	93	31	28
	West. Gulf	0	0	0	0	1	0	169	40	22	9
	Aleutians	2	0	0	0	43	0	32	0	0	23
	Bering Sea	25	33	101	0	3264	0	466	418	695	111
TOTALS	Cent. Gulf	2643	1369	1610	4195	4594	5519	13325	31215	65930	100362
	West. Gulf	0	73	239	353	176	445	12086	4593	10726	17388
	Aleutians	4	0	5317	5291	4139	408	2050	4524	4590	10588
	Bering Sea	612	2594	9259	19839	41537	42830	70566	93824	213961	639547
GRAND TOTALS		3259	4036	16425	29678	50446	49202	98027	134156	295207	767885

Tabl 3. Ex-vessel value of groundfish caught in the Westward Region in 1987 and 1988 (millions of dollars). Includes catcher-processor, mothership, and shore-based landings. (Source: ADF&G Kodiak Westward Region groundfish database, 12 Feb 1989).

Species	Year 1987	1988
Pollock	27.4	70.5
Sablefish	29.4	49.7
Halibut	42.2	37.4
Pacific cod	21.3	30.8
Rockfish	13.7	17.8
Flounder	8.2	17.4
Atka mackeral	0	2.3
General	0.1	0.1
Total:	142.3	226.0

Table 4. Number of groundfish vessels in the western Gulf of Alaska and Bering Sea by FMP species group, FMP ar and year: 1978-1988. Data not available for 1986. (Source: ADF&G fish ticket database)

Species	FMP Area	1978	1979	1980	1981	1982	1983	1984	1985	1987	1988
Pacific Cod	Cent. Gulf	57	37	39	36	82	61	48	56	565	362
	West. Gulf	8	0	2	13	13	6	9	10	139	151
	Aleutians	3	3	0	13	10	9	5	6	30	19
	Bering Sea	2	6	17	22	49	40	50	46	109	132
Pollock	Cent. Gulf	10	13	15	14	16	10	13	17	145	130
	West. Gulf	0	0	1	1	5	2	0	9	10	21
	Aleutians	0	0	0	1	1	1	2	2	0	5
	Bering Sea	2	0	9	1	7	20	11	24	46	62
Sablefish	Cent. Gulf	4	15	7	4	12	27	60	140	335	409
	West. Gulf	0	0	2	0	0	2	15	67	79	104
	Aleutians	0	0	0	0	1	1	2	15	60	72
	Bering Sea	0	0	1	1	22	5	31	57	91	81
Flounder	Cent. Gulf	13	14	11	14	17	19	13	16	81	83
	West. Gulf	1	0	0	0	0	1	3	4	42	23
	Aleutians	0	0	0	0	0	0	1	3	59	61
	Bering Sea	0	21	7	0	2	2	12	16	96	100
Pacific Ocean Perch	Cent. Gulf	1	0	1	2	1	0	0	2	27	97
	West. Gulf	0	0	0	0	0	1	5	11	9	32
	Aleutians	0	0	0	0	0	0	1	8	15	40
	Bering Sea	0	0	0	0	4	1	16	13	24	33
Rockfish	Cent. Gulf	14	7	18	24	23	30	39	69	258	213
	West. Gulf	0	0	0	0	0	1	1	14	55	56
	Aleutians	0	0	0	0	0	0	0	7	52	18
	Bering Sea	0	0	0	2	1	0	8	15	60	63
Thornyheads	Cent. Gulf	0	0	0	0	0	0	4	30	68	218
	West. Gulf	0	0	0	0	0	0	3	11	56	74
	Aleutians	0	0	0	0	0	0	0	6	55	61
	Bering Sea	0	0	0	0	0	0	7	15	65	42
Atka Mackeral	Cent. Gulf	0	1	0	0	0	0	0	0	0	2
	West. Gulf	0	0	0	0	0	0	2	0	0	5
	Aleutians	0	0	0	0	0	0	0	0	0	5
	Bering Sea	0	0	0	0	0	0	0	0	0	6
Other	Cent. Gulf	25	68	58	75	75	51	11	37	40	30
	West. Gulf	1	0	0	0	0	2	0	3	2	5
	Aleutians	0	3	0	1	0	3	0	1	0	2
	Bering Sea	1	3	4	1	0	22	0	3	10	19
TOTALS (no. unique vessels)	Cent. Gulf	77	94	86	99	126	120	not available			
	West. Gulf	8	0	2	13	13	8				
	Aleutians	3	5	0	13	10	9				
	Bering Sea	2	31	17	23	49	40				

Table 5. Catch and estimated gross ex-vessel value of commercial species landed at the port of Kodiak in 1987. (Source: B. Nippes, ADF&G, pers. comm.

Species	Average price per pound	1987 Catch (1000 lbs)	Rank	Ex-Vessel Value (1000 $)	Rank
Groundfish (1)	0.17	101626	1	17545	2
Salmon	0.93	69008	2	63874	1
Herring	0.50	7614	3	3773	5
Tanner Crab (C. Bairdi)	2.63	5140	4	13526	3
Dungeness Crab	1.26	1451	5	1827	6
Red King Crab	4.40	1205	6	5300	4
Miscellaneous (2)	2.46	309	7	760	8
Scallops	3.45	253	8	874	7
Octopus	1.08	11	9	12	9
Total		186617		107491	

(1) Includes all groundfish except Pacific halibut.

(2) Includes C. opilio, brown king crab, and sea urchins.

Table 6. Catch and ex-vessel value of groundfish species landed at Kodiak in 1987.

SPECIES	CATCH (1000s lbs)	PRICE per lb	VALUE (1000s $)	VALUE %
PACIFIC COD	36342	0.21	7632	43
SABLEFISH	5137	0.99	5086	29
POLLOCK	57503	0.08	4600	26
ROCK SOLE	1200	0.08	96	1
MISC. FLATFISH	440	0.13	57	*
FLATHEAD SOLE	363	0.06	22	*
THORNYHEAD ROCKFISH	21	0.72	15	*
RED ROCKFISH	29	0.28	8	*
STARRY FLOUNDER	75	0.10	8	*
REX SOLE	93	0.07	6	*
BLACK ROCKFISH	62	0.08	5	*
PACIFIC OCEAN PERCH	13	0.35	4	*
MISC. ROCKFISH	28	0.13	4	*
ALASKA PLAICE	65	0.05	3	*
ARROWTOOTH FL.	72	0.03	2	*
DOVER SOLE	32	0.06	2	*
ENGLISH SOLE	24	0.06	1	*
YELLOWEYE ROCKFISH	4	0.31	1	*
GENERAL GRNDFISH	12	0.10	1	*
DUSKY ROCKFISH	3	0.20	1	*
LINGCOD	4	0.10	0	*
YELLOWFIN SOLE	3	0.13	0	*
ROUGH ROCKFISH	0	0.25	0	*
TOTALS	101528		17557	

* < 0.5

Table 7. Pounds of fish and shellfish delivered to and processed by shore-based plants in the Kodiak Borough, 1988 (preliminary) and 1989 (projected). Data pertain mostly to the Port of Kodiak although relatively small catches from other ports in the Borough are included. Landings from catcher-processors and motherships are not included. Data compiled as of 12/15/88 by ADF&G staff: L. Malloy (finfish), L. Watson (groundfish), and A. Spalinger (shellfish).

Species	KODIAK BOROUGH 1988 Preliminary Landings (lb)	1989 Projected Landings (lb)
GROUNDFISH		
Pollock	99,666,000	120,000,000
Pacific cod	59,535,000	92,500,000
Flatfish	10,143,000	36,000,000
Sablefish	8,820,000	9,000,000
Other	2,426,000	4,500,000
Sub-total	180,590,000	262,000,000
HALIBUT (dressed)	18,000,000	17,000,000
SALMON		
Kings	296,000	53,000
Reds	15,471,000	14,250,000
Coho	2,569,000	1,700,000
Pinks	55,005,000	39,900,000
Chums	12,687,000	7,120,000
Sub-Total	86,028,000	63,023,000
HERRING		
Sac-Roe	4,700,000	4,400,000
Food/Bait	434,000	1,300,000
Sub-Total	5,134,000	5,400,000
CRAB		
King	1,202,000	1,202,000
Tanner	5,400,000	5,900,000
Dungeness	2,100,000	2,000,000
Sub-Total	8,702,000	9,102,000
MISC. SHELLFISH		
Scallops	150,000	150,000
Shrimp	320	300
Sea Urchins	200,000	200,000
Octopus	2,000	2,000
Clams	0	0
Sub-Total	352,320	352,300
TOTAL POUNDS PROCESSED	298,805,820	356,877,300

Table 3. Catch and estimated gross ex-vessel value of commercial species landed at the port of Dutch Harbor in 1987. (Source: B. Nippes, ADF&G, pers. comm.)

Species	Average price per pound	1987 Catch (1000 lbs)	Rank	Ex-Vessel Value (1000 $)	Rank
Groundfish (1)	0.11	73951	1	8368	3
Tanner Crab (C. opilio)	0.73	44355	2	32379	1
Brown King Crab	2.90	5113	3	14827	2
Miscellaneous (2)	0.27	2795	4	760	5
Red King Crab	4.01	1195	5	4792	4
Blue King Crab	4.04	164	6	664	6
Total	0.48	127573		61789	

(1) Includes all groundfish except Pacific halibut.
(2) Includes dungeness crab, Korean hair crab, C. bairdi, herring, salmon, squid and snails.

1987

Table 9. Abundance of prohibited species ("bycatch") and species composition in commercial domestic fisheries as observed by the Alaska Department of Fish and Game.

Catch Details	Species	1 Catch (%)	2 ---Bycatch--- Kg/mt	No./mt
Area: KODIAK EAST SIDE Gear: BOTTOM TRAWL Target Species: mixed	Prohibited			
	Halibut	2.7	39.1	6.8
	Tanner crab	0.1	3.9	8.3
	R.king crab	T	T	T
	Salmon	0.1	1.0	0.4
Date: All of 1987	Commercial			
Stat. Areas Sampled:	Pacific cod	55.5		
505800,515630,515700,	Pollock	23.0		
515730,515802,515908,	Flounder	15.6		
525630,525700,525702,	Sablefish	0.8		
535632	Rockfish	0.8		
Vessels Observed: 10	Other	1.5		
Trips Observed: 16				
Haul/sets Observed: 146				
Total Landing: 669 mt				
Area: KODIAK (BARNABAS) Gear: BOTTOM TRAWL Target Species: mixed	Prohibited			
	Halibut	1.0	14.8	4.5
	Tanner crab	0.2	5.7	11.7
	R.king crab	T	T	T
	Salmon	T	0.6	0.3
Date: All of 1987	Commercial			
Stat. Areas Sampled:	Pacific cod	60.0		
525702	Pollock	23.7		
	Flounder	13.1		
	Sablefish	0.3		
Vessels Observed: 7	Rockfish	0.5		
Trips Observed: 9	Other	1.1		
Haul/sets Observed: 77				
Total Landing: 442 mt				

1. Catch (%) is based on the observed weight of fish caught or, for longline gear, number of fish caught.
2. Bycatch = kg or no. per metric ton of landed product (whole fish, target species).

T = trace, less than 0.05.

1987

Table 10. Abundance of prohibited species ("bycatch") and species composition in commercial domestic fisheries as observed by the Alaska Department of Fish and Game.

Catch Details	Species	1 Catch (%)	2 ---Bycatch--- No./mt
Area: KODIAK EAST SIDE Gear: LONGLINE Target Species: Sable	Prohibited		
	Halibut	3.2	20.3
	Tanner crab	0.0	0.0
	R.king crab	0.0	0.0
	Salmon	0.0	0.0
Date: All of 1987	Commercial		
Stat. Areas Sampled:	Pacific cod	T	
505700,515630,525600	Pollock	T	
525630,525702,545530	Flounder	9.2	
	Sablefish	66.4	
Vessels Observed: 3	Rockfish	9.0	
Trips Observed: 3	Other	12.2	
Haul/sets Observed: 43			
Total Landing: 46 mt			
Area: KODIAK EAST SIDE Gear: LONGLINE Target Species: P. cod	Prohibited		
	Halibut	3.9	13.7
	Tanner crab	0.6	2.0
	R.king crab	0.0	0.0
	Salmon	0.0	0.0
Date: All of 1987	Commercial		
Stat. Areas Sampled: *	Pacific cod	77.7	
	Pollock	6.5	
	Flounder	4.9	
	Sablefish	0.1	
Vessels Observed: 2	Rockfish	0.1	
Trips Observed: 3	Other	6.2	
Haul/sets Observed: 8			
Total Landing: *			

1. Catch (%) is based on the observed weight of fish caught or, for longline gear, number of fish caught.
2. Bycatch = kg or no. per metric ton of landed product (whole fish, target species).

T = trace, less than 0.05.
* = confidential

1987

Table 11. Abundance of prohibited species ("bycatch") and species composition in commercial domestic fisheries as observed by the Alaska Department of Fish and Game.

Catch Details	Species	1 Catch (%)	2 ---Bycatch--- Kg/mt	No./mt
Area: KODIAK EAST SIDE Gear: MIDWATER TRAWL Target Species: pollock	Prohibited			
	Halibut	T	0.1	T
	Tanner crab	0.0	0.0	0.0
	R.king crab	0.0	0.0	0.0
	Salmon	T	0.6	0.1
Date: All of 1987	Commercial			
Stat. Areas Sampled: 515630,515700,525702	Pacific cod	1.1		
	Pollock	97.7		
	Flounder	0.9		
	Sablefish	T		
Vessels Observed: 3	Rockfish	T		
Trips Observed: 4	Other	0.2		
Haul/sets Observed: 19				
Total Landing: 170 mt				
Area: S. BERING SEA Gear: MIDWATER TRAWL Target Species: pollock	Prohibited			
	Halibut	T	0.1	T
	Tanner crab	T	0.2	1.2
	R.king crab	0.0	0.0	0.0
	Salmon	T	T	T
Date: All of 1987	Commercial			
Stat. Areas Sampled: 655430,665430	Pacific cod	0.3		
	Pollock	99.4		
	Flounder	0.3		
	Sablefish	0.0		
Vessels Observed: 3	Rockfish	0.0		
Trips Observed: 4	Other	T		
Haul/sets Observed: 15				
Total Landing: 484 mt				

1. Catch (%) is based on the observed weight of fish caught or, for longline gear, number of fish caught.
2. Bycatch = kg or no. per metric ton of landed product (whole fish, target species).

T = trace, less than 0.05.

1987

Table 12. Abundance of prohibited species ("bycatch") and species composition in commercial domestic fisheries as observed by the Alaska Department of Fish and Game.

Catch Details	Species	1 Catch (%)	2 ---Bycatch--- Kg/mt	No./mt
Area: S. BERING SEA Gear: BOTTOM TRAWL Target Species: mixed	Prohibited			
	Halibut	0.5	24.8	8.9
	Tanner crab	T	1.3	2.6
	R.king crab	0.1	4.5	2.1
	Salmon	T	0.4	T
Date: All of 1987	Commercial			
Stat. Areas Sampled:	Pacific cod	26.0		
635504,645501,655404,	Pollock	27.9		
655409,655500,665401	Flounder	43.1		
	Sablefish	T		
Vessels Observed: 3	Rockfish	T		
Trips Observed: 3	Other	2.5		
Haul/sets Observed: 98				
Total Landing: 229 mt				

1. Catch (%) is based on the observed weight of fish caught or, for longline gear, number of fish caught.
2. Bycatch = kg or no. per metric ton of landed product (whole fish, target species).

T = trace, less than 0.05.

Table 13. 1988 bycatch rate of prohibited species and species composition in domestic commercial fisheries as observed by the Alaska Department of Fish and Game.

Catch Details	Species	1 Catch (%)	2 ---Bycatch--- No./mt	Kg/mt
	Prohibited			
Area: Kodiak area	Halibut	4.0	14.1	57.1
Gear: Bottom Trawl	Tanner crab	0.1	4.7	1.7
Target Species: mixed	R.king crab	T	T	T
	Salmon	0.1	0.4	0.9
Inclusive Dates:	Herring	0.0	0.0	0.0
01 Jan 88 - 31 Dec 88	Commercial			
Vessels Observed: 19	Pacific cod	31.0		
Trips Observed: 44	Pollock	22.6		
Hauls/Sets Observed: 307	Flounder	31.5		
Total Landing: 1319.7 mt	Sablefish	5.8		
Stat. Areas Observed:	Rockfish	2.6		
495730 495800 505700	Other	2.4		
505730 505800 515630				
515700 515730 515802				
525600 525630 525702				
525806 525807 535602				
535733 535734 535802				
535803				

1. Catch (%) refers to total catch brought on deck and is based on the observed weight of fish caught or, for longline and pot gear, the number of fish caught. Species proportions in individual trawl tows (or sets of longline/pot gear) were determined by observer's samples and expanded to the total tow weight which was visually estimated by the skipper or observer.
2. Bycatch = kg or no. per metric ton of landed fish (whole fish, all species, including landed discard) as listed on the fish ticket. Longline and pot gear kg/mt was generated from the average weight of those fish which were weighed.

T = trace, less than 0.05
0.0 = no catch.

Table 14. 1988 bycatch rate of prohibited species and species composition in domestic commercial fisheries as observed by the Alaska Department of Fish and Game.

Catch Details	Species	1 Catch (%)	2 ---Bycatch--- No./mt	Kg/mt
	Prohibited			
Area: Cent. Gulf Alaska	Halibut	11.0	64.2	678.5
Gear: Longline	Tanner crab	T	T	T
Target Species: Sablefish	R.king crab	0.0	0.0	0.0
	Salmon	0.0	0.0	0.0
Inclusive Dates:	Herring	0.0	0.0	0.0
01 Jan 88 - 31 Dec 88	Commercial			
Vessels Observed: 4	Pacific cod	2.9		
Trips Observed: 5	Pollock	T		
Hauls/Sets Observed: 62	Flounder	6.6		
Total Landing: 63.6 mt	Sablefish	63.9		
Stat. Areas Observed:	Rockfish	12.2		
435931 445931 475830	Other	3.3		
475900 495730 505730				
515700 525600 525630				
535602				

1. Catch (%) refers to total catch brought on deck and is based on the observed weight of fish caught or, for longline and pot gear, the number of fish caught. Species proportions in individual trawl tows (or sets of longline/pot gear) were determined by observer's samples and expanded to the total tow weight which was visually estimated by the skipper or observer.
2. Bycatch = kg or no. per metric ton of landed fish (whole fish, all species, including landed discard) as listed on the fish ticket. Longline and pot gear kg/mt was generated from the average weight of those fish which were weighed.

T = trace, less than 0.05
0.0 = no catch.

Table 15. 1988 bycatch rate of prohibited species and species composition in domestic commercial fisheries as observed by the Alaska Department of Fish and Game.

Catch Details	Species	1 Catch (%)	2 ---Bycatch--- No./mt	Kg/mt
	Prohibited			
Area: Kodiak area	Halibut	T	T	T
Gear: Midwater Trawl	Tanner crab	0.0	0.0	0.0
Target Species: Pollock	R.king crab	0.0	0.0	0.0
	Salmon	0.1	0.2	0.5
Inclusive Dates:	Herring	T	0.7	T
01 Jan 88 - 31 Dec 88	Commercial			
Vessels Observed: 11	Pacific cod	1.0		
Trips Observed: 22	Pollock	97.3		
Hauls/Sets Observed: 54	Flounder	0.8		
Total Landing: 1529.4 mt	Sablefish	0.1		
Stat. Areas Observed:	Rockfish	T		
515730 525630 525702	Other	0.8		
525731 525732 525802				
525805 525807 535802				
545732				

1. Catch (%) refers to total catch brought on deck and is based on the observed weight of fish caught or, for longline and pot gear, the number of fish caught. Species proportions in individual trawl tows (or sets of longline/pot gear) were determined by observer's samples and expanded to the total tow weight which was visually estimated by the skipper or observer.
2. Bycatch = kg or no. per metric ton of landed fish (whole fish, all species, including landed discard) as listed on the fish ticket. Longline and pot gear kg/mt was generated from the average weight of those fish which were weighed.

T = trace, less than 0.05
0.0 = no catch.

Table 16. 1988 bycatch rate of prohibited species and species composition in domestic commercial fisheries as observed by the Alaska Department of Fish and Game.

Catch Details	Species	1 Catch (%)	2 ---Bycatch--- No./mt	Kg/mt
	Prohibited			
Area: SE Bering Sea	Halibut	0.8	6.4	16.8
Gear: Bottom Trawl	Tanner crab	T	2.7	0.5
Target Species: mixed	R.king crab	T	T	T
	Salmon	T	0.1	0.4
Inclusive Dates:	Herring	T	T	T
01 Jan 88 - 31 Dec 88	Commercial			
Vessels Observed: 4	Pacific cod	53.3		
Trips Observed: 4	Pollock	31.2		
Hauls/Sets Observed: 26	Flounder	12.5		
Total Landing: 253.5 mt	Sablefish	T		
Stat. Areas Observed:	Rockfish	0.1		
645501 655409 655430	Other	2.0		
655500 665430				

1. Catch (%) refers to total catch brought on deck and is based on the observed weight of fish caught or, for longline and pot gear, the number of fish caught. Species proportions in individual trawl tows (or sets of longline/pot gear) were determined by observer's samples and expanded to the total tow weight which was visually estimated by the skipper or observer.
2. Bycatch = kg or no. per metric ton of landed fish (whole fish, all species, including landed discard) as listed on the fish ticket. Longline and pot gear kg/mt was generated from the average weight of those fish which were weighed.

T = trace, less than 0.05
0.0 = no catch.

Table 17. 1988 bycatch rate of prohibited species and species composition in domestic commercial fisheries as observed by the Alaska Department of Fish and Game.

Catch Details	Species	1 Catch (%)	2 ---Bycatch--- No./mt	Kg/mt
	Prohibited			
Area: SE Bering Sea	Halibut	T	T	T
Gear: Midwater Trawl	Tanner crab	0.0	0.0	0.0
Target Species: Pollock	R.king crab	0.0	0.0	0.0
	Salmon	T	T	T
Inclusive Dates:	Herring	T	0.4	0.2
01 Jan 88 - 31 Dec 88	Commercial			
Vessels Observed: 3	Pacific cod	1.3		
Trips Observed: 3	Pollock	98.3		
Hauls/Sets Observed: 14	Flounder	0.3		
Total Landing: 829.8 mt	Sablefish	T		
Stat. Areas Observed:	Rockfish	0.0		
655409 655500 665430	Other	T		

1. Catch (%) refers to total catch brought on deck and is based on the observed weight of fish caught or, for longline and pot gear, the number of fish caught. Species proportions in individual trawl tows (or sets of longline/pot gear) were determined by observer's samples and expanded to the total tow weight which was visually estimated by the skipper or observer.
2. Bycatch = kg or no. per metric ton of landed fish (whole fish, all species, including landed discard) as listed on the fish ticket. Longline and pot gear kg/mt was generated from the average weight of those fish which were weighed.

T = trace, less than 0.05
0.0 = no catch.

Table 18. Incidental catch of marine mammals and seabirds by domestic fishing vessels as recorded by ADF&G on-board observers.

Gear Type	Year	No. of Trips Observed	No. of Hauls/ Sets Observed	Duration of Hauls/ Sets (hr) Observed	No. of Marine Mammals Observed	No. of Seabirds Observed
Bottom Trawl	1978	3	20	74	0	0
	1979	8	53	45	0	0
	1980	16	157	360	4[a]	0
	1981	3	34	66	0	0
	1982	5	30	43	0	0
	1984	20	227	506	0	0
	1985	9	191	260	0	0
	1986	8	85	147	0	0
	1987	19	248	493	0	0
	1988	17	131	284	0	0
	Totals	108	1176	2278	4[a]	0
Midwater Trawl	1987	9	39	135	0	0
	1988	2	9	23	0	0
	Totals	11	48	158	0	0
Longline	1984	2	39	534	0	0
	1986	3	23	106	0	0
	1987	6	51	730	0	64[b]
	1988	5	37	477	0	0
	Totals	16	150	1847	0	64[b]
Pots	1987	3	39	3498	0	0
	1988	1	19	433	0	0
	Totals	4	58	3931	0	0

[a] Steller sea lions: 3 dead, 1 released alive.
[b] fulmars: all dead

Table 19. Number of ADF&G groundfish fish tickets and ticket line items in 1987 and 1988 processed in Kodiak for the Westward Region. (Source: NMFS Groundfish Information System datafeed).

	1987				1988			
	Tickets		Ticket Items		Tickets		Ticket Items	
Region of Entry	No.	%	No.	%	No.	%	No.	%
Westward	8617	69	19754	48	7109	57	28594	51
Central	818	7	2965	7	1432	11	8551	15
Southeastern	2642	21	17450	42	3914	32	19418	34
Misc.	499	4	901	2				
Totals:	12576		41070		12455		56563	

Table 20. Comparison of total average catches (kg/hr) by area during the March 1988 and November 1987 ADF&G trawl survey in Viekoda Bay, Spiridon Bay, and Kupreanof Strait, Kodiak Island. "Commercial" tows are not included.

	Viekoda Bay ----Survey---- tows=12 March	tows=5 November	Spiridon Bay ----Survey---- tows=13 March	tows=7 November	Kupreanof[1] --Survey-- tows=6 November
Dungeness Crab (M)	0.7	1.8	5.9	4.9	0.8
Dungeness Crab (F)	0.0	1.5	3.8	1.1	0.1
Total Dungeness Crab	0.7	3.3	9.7	6.0	0.9
Red King Crab (M)	0.0	2.7	0.0	0.0	0.0
Red King Crab (F)	0.0	0.6	0.0	0.0	0.0
Total King Crab	0.0	3.3	0.0	0.0	0.0
Tanner Crab (M)	47.8	19.1	23.0	21.2	6.2
Tanner Crab (F)	48.3	9.3	18.8	17.9	3.3
Total Tanner Crab	96.1	28.4	41.8	39.1	9.5
Total Crab	96.8	35.0	51.5	45.1	10.4
Other invertebrates	14.3	110.2	260.5	243.9	109.9
Alaska Plaice	96.6	198.8	117.7	116.8	52.1
Arrowtooth Flounder	180.6	488.4	49.0	872.4	2731.5
Butter Sole	0.8	0.0	0.3	10.2	9.3
Dover Sole	4.1	88.5	1.0	109.9	242.2
English Sole	0.8	12.6	6.1	682.9	234.3
Flathead Sole	647.9	1945.0	429.5	3505.4	694.0
Halibut	60.4	286.1	49.9	61.5	139.0
Rex Sole	7.7	52.9	1.4	0.0	369.3
Rock Sole	106.1	98.4	39.6	55.6	129.5
Sand Sole	1.0	0.0	1.1	0.0	0.0
Starry Flounder	177.8	407.4	1047.7	3996.8	0.0
Yellowfin Sole	1200.9	744.1	542.4	5653.9	159.3
Total Flatfish	2484.7	4322.2	2285.5	15065.4	4760.5
Herring	0.8	0.0	0.0	9.6	14.0
Pacific Cod	69.6	187.2	51.4	57.6	122.4
Pollock	183.0	1837.1	63.3	990.3	460.9
Sablefish	0.9	8.0	1.4	20.7	164.6
Rockfish	4.8	0.0	0.2	0.0	14.0
Sculpins	248.9	102.9	84.1	99.9	142.3
Other Roundfish	9.4	2.4	3.2	46.8	8.1
Total Roundfish	517.4	2137.6	203.6	1224.9	912.3
Skates	16.5	10.0	36.6	274.2	12.0
Grand Total	3130	6615	2838	16854	5805

[1]No survey was conducted in Kupreanof in March 1988
M = Male, F = Female

Table 21. Seasonal comparison of bycatch (November 1987 and March 1988) for halibut, Tanner crab, king crab, and Dungeness crab caught using a bottom trawl within a stratified survey grid in Viekoda and Spiridon Bays. Estimates based on flatfish over 10 inches or 12 inches.

Prohibited Species	Bycatch[1] Units	Viekoda Bay tows=12 Mar. 88 10"	12"	Nov. 87 10"	12"	Spiridon Bay tows=5 Mar. 88 10"	12"	tows=7 Nov. 87 10"	12"	Kupreanof Strait tows=6 Nov. 87[2] 10"	12"
Halibut	no./hr	19	19	125	125	14	14	16	16	47	47
	no./mt	8	13	22	28	6	7	1	1	17	23
	kg/hr	62	62	286	286	56	56	62	62	139	139
	kg/mt	25	42	61	79	24	29	4	6	48	66
Tanner crab	no./hr	403	403	69	69	131	131	111	111	33	33
	no./mt	167	275	12	16	55	67	8	9	12	17
	kg/hr	101	101	28	28	40	40	39	39	10	10
	kg/mt	42	69	6	15	17	22	8	9	12	16
Red king crab	no./hr	0	0	11	11	0	0	0	0	0	0
	no./mt	0	0	2	2	0	0	0	0	0	0
	kg/hr	0	0	3	3	0	0	0	0	0	0
	kg/mt	0	0	1	1	0	0	0	0	0	0
Dungeness crab	no./hr	1	1	5	5	34	34	2	2	13	13
	no./mt	1	1	1	1	14	17	1	1	1	1
	kg/hr	1	1	3	3	11	11	6	6	1	1
	kg/mt	1	1	1	1	5	6	1	1	0.4	1

[1]mt = metric ton of landed weight of commercial species. Because samples were not actually "landed" at port for commercial sale, we estimated landed weight by summing weights of all pollock, Pacific cod, and sablefish caught, together with all flatfish (except arrowtooth flounder) that were larger 10 inches and then 12 inches.

[2]No Survey was conducted in Kupreanof in March 1988.